DOCUMENT RESUME

ED 368 306 HE 027 331

TITLE	The Universities and the Labour Market. Proceedings of the New Zealand Council for Educational Research (Wellington, New Zealand, October 1993).
INSTITUTION	Association of Univ. Staff of New Zealand, Wellington.; New Zealand Council for Educational Research, Wellington.
REPORT NO	ISBN-0-908916-62-0
PUB DATE	Oct 93
NOTE	143p.
AVAILABLE FROM	Distribution Service, New Zealand Council for Educational Research, P.O. Box 3237, Wellington, New Zealand.
PUB TYPE	Collected Works - Conference Proceedings (021)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	Educational Change; *Educational Trends; Education Work Relationship; Foreign Countries; Government Role; *Higher Education; Labor Force; *Labor Market; Planning; School Business Relationship; Statistical Analysis; Tables (Data); Universities
IDENTIFIERS	*New Zealand

ABSTRACT

This publication contains the proceedings of a conference on the universities, labor market, the academic labor pool, and society's needs for educated workers in New Zealand. Following background information on the conference, a list of participants, and a conference program; the texts of the two keynote presentations are given including questions and following discussion. The first presentation was by Simon Upton, "The Labour Market and the Universities" and looked at the present role of higher education in New Zealand, current pressures, and changes. It proposes some principles for thinking about education and labor, discusses the pros and cons of a system driven by student choice; and looks at the merits of a purchasing agent model. The second presentation, "Educating Highly Skilled Labour: Demographic Aspects of the Contributions of the Universities," by Ian Pool and Lisa Davies, is a research-based essay on enrollment, historical, and demographic trends in higher education. Additional papers included in this publication but not formally presented include additional technical responses to the second keynote address with extensive figures and tables, "The International Market for Academics" by Ed Vos, and "A Note on Occupational Projections in the United States of America" by Dennis Rose. The final section offers commentary on the entire conference. Both keynote papers include references. (JB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 368 306

Proceedings of

THE UNIVERSITIES AND THE LABOUR MARKET

NZCER
October 1993

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

New Zealand Council for Educational Research

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

An AUSNZ AND NZCER Sponsored Seminar

BEST COPY AVAILABLE

New Zealand Council
for Educational Research
P.O. Box 3237
Wellington
New Zealand

The Association of University
Staff of New Zealand (Inc.)
P.O. Box 11-767
Wellington
New Zealand

© NZCER/AUSNZ 1993

ISBN 0-908916-62-0

BEST COPY

CONTENTS

Foreword
Participant List
Conference Programme

Keynote Presentations:

The Labour Market and the Universities
Hon. Simon Upton

Questions/Discussion

Educating Highly Skilled Labour: Demographic Aspects of the Contribution of the Universities
Ian Pool and Lisa Davies

Questions/Discussion

Respondents:

Steve Marshall, NZ Employers' Federation
Stephenie Doyle, NZ Council of Trade Unions
Anne Meade, NZ Council for Educational Research

Questions/Discussion

Tim Blackmore, NZ Vice-Chancellors' Committee
Ed Vos, Association of University Staff of NZ

Questions/Discussion

Additional Papers (not formally presented)

Response to Keynote Paper: Educating Highly Skilled Labour..., Ministry of Education

The NZ Academy for the Humanities

A Note on Occupational Projections in the USA
Denis Rose, BERL

Commentary on the Day's Proceedings *Denis Rose, BERL*

FOREWORD

The New Zealand Council for Educational Research (NZCER) has had a long association with universities. Its first Director, Dr Beeby, came from Canterbury University College in 1934. Its third Director, George Parkyn, conducted a major study on *Success and Failure at the University* (1967) based on a cohort of students who attended the then federal University of New Zealand in 1955. In 1980, Ian Livingstone (who was to become the Council's fifth Director) wrote *Twenty Years On*, a modest follow-up study of the 1955 cohort to ascertain their life changes and chances in the intervening decades. In that study, concerns were expressed at the high emigration rate of New Zealand graduates. In the colloquial language of the day, it was described as the "brain drain".[1]

Earlier this year, a conversation with the Association of University Staff (AUS), following a *Time* article on "Talent Questing"[2], the outward migration of highly skilled New Zealanders to Australia, led to a proposal for a joint seminar which would explore these concerns about the supply and retention of a highly skilled, university-educated group within our population to satisfy labour market needs. NZCER was interested in the supply and retention of graduates and their significance in the labour market generally, and AUS had a particular interest in the impact of demographic changes of relevance to university functioning (including staff:student ratios and industrial issues for university staff).

It was decided to base the seminar around two papers: one prepared by the demographers similar to papers prepared for the Planning Council and for the Watts Committee in the late 1980s; and one from a Cabinet Minister to explore some policy issues relating to the supply and retention of highly-skilled workers in the labour market. Professor Ian Pool and Lisa Davies from the University of Waikato agreed to prepare the demographic material, and the Hon. Simon Upton, Minister for Research, Science and Technology, agreed to prepare a paper on "The Labour Market and Universities".

The liveliness of the seminar was assured.

Pool and Davies supplied their paper with time for it to be circulated to commentators and seminar participants. Unfortunately, the Minister's busy schedule meant that there were delays in the completion of his paper so that it was only available on the day of the seminar. Only limited discussion of his paper was possible as a consequence.

Since the seminar, NZCER has begun discussions with other organisations who may be interested in the development of highly-skilled professionals to ascertain the need for further research on participation (and graduation) of mature, part-time and external students who undertake tertiary education in order to re-skill.

AUS continues to lobby for improved data collection and sharing of statistical information among universities, and by the Ministry of Education and Statistics New Zealand.

NZCER and AUS would like to thank the two keynote speakers and the commentators for their informative and stimulating papers.

Dr Graham Wagner (NZCER) and Charlotte Fitzgerald (AUS) provided invaluable assistance with planning and organising the seminar, and with collating the proceedings.

Kia ora koutou katoa.

Anne Meade, PhD
NZCER

Rob Crozier
AUSNZ

1. A further follow-up study was undertaken in the mid-1980s, thirty years on, but Ian Livingstone is yet to finish writing up the report.
2. Reid, Bronwyn "Talent Questing: New Zealand's brightest are increasingly calling Australia home", *Time*, 26 April 1993.

PARTICIPANTS

Hon Simon Upton
Minister of Research, Science and Technology

Professor Ian Poole
Population Studies Centre
University of Waikato

Lisa Davies
Population Studies Centre
University of Waikato

Steve Marshall
NZ Employers Federation

Stephanie Doyle
NZ Council of Trade Unions

Anne Meade
NZ Council for Educational Research

Tim Blackmore
NZ Vice-Chancellors Committee

Ed Vos
Association of University Staff (AUS)

Kathy Gordon
Ministry for Research, Science and Technology

Robert Barton
State Services Commission

Dennis Foy
Accountants Society

Jim Doyle
APNZ

Helen Beaglehole
Ministry of Women's Affairs

Professor Gary Hawke
Institute of Policy Studies

Maree Cooney
Foundation for Research, Science and Technology
Brian Opie
Society for the Humanities

Marjorie Truong
Ministry of Education

Sharon Evans
Statistics New Zealand

Hazel Barnes
NACEW

Chris Deardon
NZVCC

Alan Grout
AUSNZ

Val Podmore
NZCER

Jan Rivers
Dominion

Cathie Bell
Dominion

Ralph Chapman
Economic Advisor
Minister of Research, Science & Technology

Chair: Rob Crozier
AUSNZ

Facilitator: Dennis Rose
BERL

Rapporteur: Charlotte Fitzgerald
AUSNZ

Co-ordinator: Graham Wagner
NZCER

Apologies:
Kirsty Graham
NZUSA

Alastair Shaw
NZUSA

Ken Douglas
NZCTU

Maris O'Rourke
Ministry of Education

CONFERENCE PROGRAMME

The Universities and the Labour Market

Thursday 14 October
9:30 am - 4:00 pm

NZCER Conference Room
Education House
Willis Street, Wellington

9:30 - 9:40	**Opening and Welcome**	*Anne Meade, Director, NZCER*
9:40 - 10:15	**Keynote Presentation**	*The Hon. Simon Upton, Minister for Research, Science & Technology*
10:15 - 10:30	**Questions/Discussion**	
10:30 - 10:50	**Morning Tea**	
10:50 - 11:25	**Keynote Presentation "Educating Highly Skilled Labour: Demographic Aspects of the Contribution of the Universities"**	*Ian Poole/Lisa Davies Population Studies Centre University of Waikato*
11:25 - 11:40	**Questions/Discussion**	
11:40 - 12:40	**Respondents**	*NZ Employers Federation NZ Council of Trade Unions NZ Council for Educational Research*
	Questions/Discussion	
12:40 - 1:30	**Lunch**	
1:30 - 2:30	**Respondents**	*NZ Vice-Chancellors' Committee Association of University Staff*
2:30 - 2:50	**Afternoon Tea**	
2:50 - 4:00	**Plenary Session Discussion and Wrap-up of day's proceedings**	*Dennis Rose, Economist, BERL*

EMBARGOED AGAINST DELIVERY

13 October 93

"THE LABOUR MARKET AND THE UNIVERSITIES"

HON SIMON UPTON

PRESENTATION TO NZCER/AUSNZ SEMINAR, 14 OCTOBER

INTRODUCTION

- I'm speaking today as someone with an interest in both economic policy (wearing my Associate Minister of Finance 'hat') and research, science and technology (my other hat). I see tertiary education policy as vitally important both as an element of economic policy (because of its growth implications and fiscal aspects) and also as an element of the research, science and technology picture.

- Since I do not have direct portfolio responsibilities in the areas of Education, Labour or Employment, I have the luxury of being able to stand back and to reflect on overall direction. The other side to that of course is that what I say today will not be informed by a detailed knowledge of the area, and accordingly will be impressionistic.

- In thinking about the topic, I have reflected on why universities exist, and what their role is in present-day New Zealand. It also strikes me as useful to ask ourselves what it is universities are contributing in terms of the supply of skills and aptitudes to the labour market. Can we tell how well they are doing? Could they be doing better?

- Claims are frequently made of emerging skill shortages and oversupplies of certain skills. There are also concerns that these may impede the recovery or reduce its sustainability. How valid are these concerns? To the extent they are valid, what is the best approach to addressing them? At what cost and with what difficulty? If we judge the concerns unlikely to be valid, what is the most helpful way to think about the issues?

- I can't answer all these questions, but I intend to touch on some of the relevant issues, and how the way we look at them is changing.

CHANGING ASSUMPTIONS

- I want to start by examining some assumptions. What are the implicit social messages our society and our system have conveyed about university education, its value, funding and so on? How have those messages changed over time? Should they change further?

- Traditionally New Zealand seems to have taken the view that university education was a 'good thing'; that it was to the benefit of society as a whole that a proportion of the population did receive such an education, with generous financial support from the state in the process. New Zealand's level of participation in university education was limited. It was certainly lower than North American levels (although probably not as low as the UK's)[1]. While the the level of state support to those attending was high[2], access in practice tended to be largely limited to those from homes with middle to high income parents.[3] The clear assumption was that not everyone needed university-level education or training, and the norm-referenced examination system dovetailed neatly with this assumption by 'sorting out' a good proportion during their progress through school.[4] Once at university, student choice was constrained by the universities' allocation of resources. The unchallenged arrangement was that the state funded the institutions, and left allocational decisions to them.

- Following the University Grants Committee's acknowledgement that the funding system needed to become more transparent, and subsequently under the new EFTS (equivalent full time student) funding system, there has been a change to a mechanism placing greater weight on student preferences. Funding is now, to a greater extent, driven by student numbers and the distribution of those numbers across programmes, and institutions are beginning to compete for students. This has been

---

[1] Boston (1988) pp43-45.

[2] OECD (1993, p90) for 1988 data; see also Marais (1991, p22).

[3] Tertiary Review Group (1991), cited in Richardson (1992) p67.

[4] For an interesting comment on this, see Sir Christopher Ball's Lecture 3, p68, in Hawke (1991a).

accompanied by a change in the assumption about what is a desirable level of participation, reflecting society's apparently greater demand for access to tertiary places. Behind this has been a growing realisation of the importance of education to income prospects, at the individual level, and the strength of the link between human resource development[5] and economic growth at the national level.

- In the post-war period, the protected nature of the economy was very important in shaping attitudes and creating expectations of full employment --a job was available irrespective of educational attainment. Correspondingly, adjustment to the opening up of the economy has been difficult especially for those with few or inappropriate skills. We can see the lagged effects of this, at the top end of the scale, in the evidence that managers still have a considerable amount of adjustment to undertake,[6] according to the 1993 World Competitiveness Report, for example. And at the other end of the scale, those with no or minimum educational qualifications are at least twice as likely to be unemployed as those who have received some formal educational qualification.[7]

- Awareness seems to be growing that international competition is increasingly on the basis of human capital rather than physical capital. As our economy becomes more integrated with economies in Asia, around the Pacific, and elsewhere, it is evident that our labour market will become more integrated too. We are already seeing early signs of this-- for example with Singapore's $200 million recent international recruitment drive and interest in our graduates.[8]

---

[5] e.g. Lucas (1993): "The main engine of growth is the accumulation of human capital --of knowledge-- and the main source of differences in living standards among nations is differences in human capital." (p270). It should perhaps also be noted that Lucas places most weight on learning on the job.

[6] See Table 2, Appendix 1 for data on New Zealand's quality of management. Cited in Hampl (1993).

[7] OECD (1993), p79.

[8] Source: Singapore National Science and Technology Board presentation, 1993.

- New Zealanders increasingly seem to realise that they can no longer make the assumption that they will get or retain a job unless they are prepared to acquire skills that are valuable. As a 'learning culture' develops, this becomes a more familiar notion, as does the realisation that those who seek high incomes need to acquire skills that are valued in the international marketplace. Such investment will be critical to sustaining economic growth, as we look out beyond the current recovery. The 1993 World Competitiveness Report is encouraging about many aspects of our economy but does raise questions about how well the education and training of our labour force meets the needs of a competitive economy.[9]

- One reason why attitudes are changing is that the labour market itself is changing in terms of rewards for skill: the trend appears to be towards greater pay differentials for skill. These are likely to be internationally driven. More widespread enterprise bargaining, encouraged by the ECA, together with a greater emphasis on incentives for performance,[10] are likely to be reflected in wider pay differentials.

- To return to my theme, there has been a substantial degree of inter-party consensus on how to proceed, within the tertiary sector, in giving effect to the desire to improve investment in human capital. The EFTS system for example, though introduced by Labour, has been endorsed and extended by this Government. There has also been substantial inter-party agreement on the need to expand participation in the tertiary sector.[11] Despite the prognostications of some, participation has grown dramatically despite some increases in student fees.

- It can be argued that the dominant message to students implicit in the current arrangements is: "Come to university or polytech... You need to if you want to secure good employment and income prospects. The state can afford to subsidise you, not quite as much as we could afford to before, but still pretty substantially.

---

[9] See Annex 1, Table 1.

[10] The OECD (1993, p76) pointed to some, admittedly soft, evidence of increasing dispersion of unemployment rates by occupation. The 1993 Budget assessment (Richardson, 1993a,p26) was that wage dispersion would probably increase.

[11] e.g. Patterson (1991) p10.

When you're here, do what you like." Of course, it's not quite this simple: there are also a number of constraints in the system on what courses students can do. I'll come back to those. But that is the essence of the current message.

- In short, there has been a subtle change of message since the days when fewer young people went on to tertiary education and people looked askance at the idea of institutions competing for students. The widespread assumption, and I think it's by and large a sound one, is that more young people than before can benefit from a tertiary education. But the part of the message which I think is vital and is not so readily accepted is that, if we are going to have significantly higher participation rates in post-compulsory education, then people will have to accept responsibility for paying for part of it themselves.

- To evaluate these messages, and the assumptions people make in response, I shall review more closely some of what has happened, to universities in particular, over recent years, and look at the funding system and its effects.

WHERE IS THE SYSTEM NOW?

- We have in recent years seen rapid tertiary sector growth, with rising participation.[12] Factors behind that include some easing of barriers to progression to higher levels of schooling and changes in the state of the economy (for example, unemployment, and structural changes in product and labour markets).

- The rapid growth in the tertiary sector, and the associated growth in costs, raise questions of whether the taxpayer is getting value for money and of whether, in this quest, expansion has pushed us into realms of diminishing returns and the erosion of quality. In

---

[12] Some 78,000 more New Zealanders are now in tertiary education and training than when the National Government took office in 1990 (Smith, 1993, p3). The participation rate of 18-year-olds rose to 40% in 1992, as against 24% in 1985. Between 1991 and 1993, the number of funded equivalent full-time students (EFTSs) in tertiary study rose from around 114,000 to around 132,000, an increase of close to 18,000. (Ministry of Education, 1993, p28). About 137,500 EFTS places will be funded in 1994, a further increase of around 4%. (Richardson, 1993, p123).

seeking a 'product' at lower cost, have we now exhausted all the possible efficiency gains? Big gains have been made over the last decade or so: universities have succeeded in pushing up student:staff ratios, by around 50%.[13] But how much higher can ratios go without creating a fall-off in the quality of teaching and the opportunity for research? Talking with a number of university staff over recent months has indicated to me that research programmes are now being significantly squeezed in some instances, by high teaching commitments. This can have a longer-term cost, not only in terms of the quantum of research, but in terms of the quality of the scholarship needed to underlie teaching and the wider contributions of the universities to society.

- Having said this, I note that tuition subsidy funding per EFTS has been maintained (in fact it has risen marginally) over the last 3 years[14] in the face of a growth in funded places of 19%. Given that fees have risen significantly, one of two conclusions can be drawn: either that universities have not achieved substantial efficiency gains in the last 3 years; or, if they have, that efficiency gains achieved have not been passed on to students but invested elsewhere.

- We also have to be careful not to assume that no further gains can be made, through, for example, stepping outside established patterns of management, and thinking laterally about new technologies of learning and interaction.[15] The allocation of resources --whether

---

[13] Prof A Brownlie, Chair of the New Zealand Vice Chancellors Committee, puts New Zealand universities' ratio at 18:1 compared to those of Australia and the UK, at about 12:1. (Brownlie, 1993).

[14] Even in real terms, government funding per EFTS has only been shaded back around 2% since 1990. Funding per 'funded' EFTS was $8518 in 1990, $8979 in 1992 and $8807 in 1993. Actual EFTS numbers for 1993 are not yet available, but funding per actual EFTS was $8518 in 1990, and $8843 in 1992 (Ministry of Education figures). These can be deflated by the CPI to give a rough indication of the opportunity cost of government spending on university places. In these terms, real funding per funded EFTS fell 1.7% from 1990 to 1993.

[15] For example, Hague (1991), Chapter V. Locally, see the discussion of a proposal for company-based management education, currently being developed by a group comprising FCL, NZ Post and 5 other NZ companies (Smith, A, 1993).

to capital investment such as new buildings, or to containing class sizes-- is of course for the universities to decide.

- It seems to me that universities could also be doing more to ease the pressures on themselves, and develop their financial security and autonomy, by further cultivating third party sources of revenue --such as consultancy, business sponsorship, and funding from alumni and alumnae.

- For the wider reality is that fiscal pressures on the government will continue. Any government inevitably has to face up to the hard trade-offs between education and other forms of spending, or debt reduction. It is worth remembering that some of the debt we have accumulated can reasonably be attributed to spending more than we could afford (or were prepared to pay for at the time), in areas such as education, in the past. Tertiary education is valuable but is also costly, at around $11,000 for every full-time student per year. As the OECD recently noted, the percentage of per capita GDP devoted to the education of a New Zealand tertiary student is substantially above the OECD average.[16]

- Let's look more closely at some of the effects of current funding arrangements --in particular, the incentives they create and the responsiveness of institutions.

- I noted before that the system is now, to a greater extent, driven by student numbers. However, it would be an exaggeration to say that we have moved all the way from funding institutions towards funding students. We have injected a 'financial management reform' element, which entails purchasing outputs rather than funding providers. It is true that the Government allocates funds by purchasing outputs (places across a range of 'programmes'). But student preferences substantially determine the universities' bids across programmes, and hence, largely, the outputs which the Government ends up purchasing.

- Previously, funding was through the University Grants Committee, using a number of formulae distinguishing different kinds of students, and on a quinquennial basis. Now, the Minister of Education, on the advice of his Ministry, decides on the grant to each tertiary institution. The grant to each institution is more

---

[16]OECD (1993) p90.

directly influenced than before by the growth and distribution of student numbers at that institution.

- As Hawke has commented, the EFTS system has tended to perpetuate the allocation of funding based on staff:student ratios that had emerged over time, in turn largely based on factors such as staff recruiting difficulties and the negotiating power of special schools: "They were in no sense the result of considered decisions about how university resources should be distributed," but reflected the "accidental pattern of historical costs."[17] These funding level 'hangover' effects are still a major influence.

- There is still an element of Ministry and institutional control over the allocation of resources between and within universities. To some extent, the Ministry is seen as a 'black box' -- the way bids, which are bound to exceed funding, are handled is not completely transparent. Allocations are largely driven by student choice of programme, but there is an element of discretion in the Ministry's assessments, at least at the margin.

- More courses now have entry restrictions or conditions placed upon entry. This has long been the case in areas such as medicine, dentistry and veterinary science (where Ministry caps have applied) but, increasingly, in-house decisions influence the allocation of students among courses.[18] In this important sense, then, students' course preferences may not be 'determinative'.

- In considering internal resource re-allocations among courses, universities naturally place weight on maintaining academic standards. But they also seem unwilling to pay more for staff in areas of high demand. These factors seem to contribute to inertia: areas of underprovision and slow adjustment. The OECD recently observed that "in higher education internal fund allocation is often biased against subjects facing expanding demand."[19]

- Conversely, university (and, to be fair, student) response to falling market demand can be slow. It is

---

[17] Hawke (1992) pp5,6.

[18] I understand, however, that Canterbury University may be an exception to this trend.

[19] OECD (1993) p91.

interesting, for example, to observe the high unemployment rate among law graduates, of 29%, compared to the average across all graduates of about 16%.[20] The growth in the differentially high rate of unemployment for law graduates in recent years has not been accompanied by a significant reduction in university law degree enrolments. One would not have expected a marked contraction, but in fact numbers have edged up[21] and a new law school has opened over this period. The universities do not appear to have reallocated funds to reduce the 'supply' of law degree places.

- In short, at this point, we have neither gone all the way to a market demand driven system, nor do we have an arrangement which separates funder and purchaser and in which the purchaser determines which outputs are produced. I will come back to the question of whether we have a 'muddle in the middle', or whether we have a sensible mixed system with which we are comfortable.

- The EFTS system creates some interesting incentives. Most notable is the incentive to 'capture' students at entry level. To the extent that this extends opportunities to young people who would not otherwise consider tertiary study, and those opportunities are then treated seriously by the students involved, this has merit. One 'downside', teaching staff tell me, is that rising participation appears to be associated with a lowering of the educational calibre (e.g. language skills) of students entering university. This is worrying if it lowers the quality of the teaching process and standards fall. Such considerations have led my colleague, the Minister of Education, to raise Bursary requirements for entrance to university, for 1994.

- There is a tendency, under the current system, to divert resources from research to teaching, and a relative over-funding of courses (often not at universities) which do not require a base of solid scholarship and research. There is of course a tendency for institutions to expand courses in EFTS categories which

---

[20] NZVCC (1992) p8. Figures are for 1992 (end-May). They are, of course, not long-term unemployment rates.

[21] Between 1991 and 1993, EFTS numbers rose from 2914 to 3198 (estimated), or 10%. Council for Legal Education (professionals) numbers are excluded. (Source: Ministry of Education).

are relatively over-funded. Offsetting the effect of this on research has been a recent expansion in funded post-graduate EFTS numbers.[22] As Minister of Research, Science and Technology, I have an interest in these trends.

- The EFTS cost-based funding system is not neutral across subjects and disciplines. The courses which happen to cost more (partly for historical reasons) are more highly subsidised. The extent of any benefit to society does not bear on the level of the subsidy. Greater neutrality might be achieved through linking the subsidy to some estimate, albeit necessarily rough, of this external benefit.

- Lastly, the EFTS system contains an incentive to expand areas which are popular even if employment prospects for graduates are limited and, at the margin, often overseas.

- The proliferation of nursing schools is one of the more notable examples of some of the perverse incentives at work. As someone in the area commented, a lot hinges on EFTS numbers --the ability to employ certain specialised staff, and possibly the pay of the chief executive, not to mention the sheer flow of dollars. It is not altogether surprising then, that we still have 15 polytechnics offering nursing courses, or 16 counting the Open Polytechnic's degree course for registered nurses only.[23] That is in addition to the 3 schools within hospitals, for enrolled nurses, and the 2 university courses, at Victoria and Massey. While the large majority of nursing graduates are employed in New Zealand, a significant proportion in recent years have taken jobs overseas. The abundance of training facilities might make more sense if it was these overseas job prospects of young New Zealanders which we were concerned to improve. I might add that there are

---

[22] EFTS numbers in cost categories 8,9 and 10 increased from 7916 in 1992 to 9600 in 1993, a 21% increase, and are expected to increase further in 1994.

[23] The number of small providers offering such courses suggests that pressures from economies of scale may, if anything, not be particularly strong. This raises questions about the conclusion of Snook (1991, p631) that the EFTS formula favours larger institutions. Nevertheless, as a measure of support for smaller institutions, a base grant (a minimum of $1000/EFTS for the first 250 places) is to be introduced in 1994.

also questions in my mind about whether the courses offered fully meet the needs of New Zealand employers in terms of clinical experience, but that is another story.

- funding arrangements which are to a significant degree driven by student numbers might be expected to generate a greater **responsiveness** on the part of universities to student preferences. It seems to me that there are signs of this, for example in the changing mix of courses available at many institutions and some moves towards performance appraisal. But whether there is significantly greater responsiveness to student views on the relative quality of teaching across courses is harder to say. Of course, in looking at any change here, one needs to allow for the effect of rising fees, generating greater student interest in course quality.

- there are real questions over the extent to which the need for responsiveness has so far filtered through into areas such as tenure, performance appraisal, and pay setting, including introducing into universities pay differentials which reflect the realities of skill and scarcity.[24]

- Summing up, it seems to me that current arrangements, and in particular the EFTS funding mechanism, have encouraged expansion, improved participation and access, and probably improved university responsiveness, for example in relation to student preferences for certain courses. Nevertheless, the EFTS system does appear to create some perverse effects, including a possible diminution in the opportunity for research, and a stronger emphasis on recruiting entry-level students than on being concerned to fit students for the labour market. In thinking about whether we should make any changes to the funding system, though, we need to step back and consider for a moment some more general 'principles' regarding tertiary education and the labour market.

PRINCIPLES

- a first principle in my view is that the value indicated by the labour market is not the only basis for deciding what tertiary institutions, and universities in

---

[24] There is some merit in the proposal of Allington & O'Shaughnessy (1992, p21) that tenure should not be abolished but modified so that it becomes a reward for achievement and service.

particular, should be doing and teaching. There is also a role for universities in terms of scholarship and as a repository of knowledge. Thomas Hobbes thought them "the fountains of civil and moral doctrine."[25] Mill, in 1867, thought "A university ought to be a place of free speculation."[26] And as Allington and O'Shaughnessy[27] argue, "universities and their research... minister to man's basic curiosity: they help turn a culture into a civilisation." Rather more critically, they have been called "the most overrated institutions of our age."[28] In my view, high quality scholarship and curiosity-driven research are important; as is the contribution of universities in conducting both basic strategic research and applied research in conjunction with others e.g. CRIs.

- having said this, if we are to sustain a competitive knowledge-based economy, it is important that the tertiary sector responds quickly to the needs of the labour market. (Of course, interaction will also flow in the other direction: new ideas from universities will influence the direction of development of the economy and hence the labour market.)

- there is no reason why tertiary institutions should be immune from financial management reforms directed at better value for money through improving the quality of services funded by, or provided in, the state sector. But because of the difficulties of output specification and the nature of the universities' role, as just outlined, we have to be careful how we frame the demands we make of universities, and how far we go in attempting to mould them into the financial management framework. The concept of self-managing institutions remains a useful one.

- It is important to recognise that markets are in general comparatively good at collecting and conveying information. Labour markets are no exception, though the nature of human capital[29], the importance of

---

[25] Lewis (1991).

[26] Quoted in Boston (1988).

[27] 1992, p14.

[28] Paul Johnson in The Spectator (Johnson, 1991).

[29] One consequence of the special features of human capital is the need to use mechanisms such as state-assisted student

externalities, and slow adjustment in many labour markets qualify the picture.

- Following on from this, the lessons from many contexts are that governments have difficulty dealing with complex information efficiently and hence with the process of deciding what investment to undertake, where this relies on such information.

- Lastly, we have to consider the characteristics of the system carefully so that its design does not encourage the participants to spend valuable time seeking favours from the government. Universities for example contain many articulate people and can be persuasive advocates.

- With these considerations in mind, I would now like to review some of the issues involved in deciding whether to move further in the direction of a student choice driven funding system, or whether we should change direction and opt for a more dirigiste purchasing model.

THE PROS AND CONS OF A STUDENT CHOICE DRIVEN SYSTEM

- I shall start with a quote from a well-known British writer on education. Sir Christopher Ball[30] reminds us that reviews of funding arrangements and other features of the university system have taken place before: "Repeatedly, society and its governments intervene to widen access, increase participation, and restore the usefulness of what the universities teach."

- Having said that, it is wise to bear in mind the costs of changing the system. Certainty is, within limits, valuable. People --parents, students, academic staff and administrators-- have to be able to plan ahead. Accordingly, we should not change the system without good reason.

- We also need to look at effects beyond those on the labour market and whether or not we are supplying the right mix of outputs and/or building the right skills in the economy. We need to look at for example the effect of any change to the system in terms of research, and the accretion of knowledge.

---

loans to overcome financing problems.

[30] Hawke (1991a) p.12.

- as a last caution, we need also to consider the context: other policy developments are taking place, for example capital charging, and a Ministerial Consultative Group on Funding Growth in Tertiary Education and Training has been established to consider funding options.

- First, what would a more student-driven system require? One co-requisite would be a higher degree of neutrality across providers. It is possible that in a more neutral system, other institutions than universities would emerge as the most appropriate vehicles for (say) undertaking high volume teaching of first or second year post-compulsory students. It would be desirable that there were no barriers to the dollars being spent at the senior secondary school, or through private training establishments (PTEs). This would be consistent with what my colleague, the Minister of Education, has called 'seamlessness'.[31] Some initial moves were taken in 1992 towards funding PTEs on a more neutral basis, but neutrality is still some way away.[32] But increasingly, universities <u>are</u> seen as only one institutional form in a spectrum of diverse and competing institutions.

- There are clearly some advantages of increasing the degree of decentralised choice. In general, and coming back to the principles set out earlier, we can expect better collection and use of information when the user has strong personal reasons to do so.

- How myopic are student choices likely to be? They are inevitably influenced to some degree by attitudinal and cultural factors which are slow to change --backward-looking ideas of social status, family tradition and inclination -- and limited awareness of changes in the wider world. A recent survey suggested that peer views of relative status of occupations was a major factor.[33] Encouragingly, so was information about course content. There is also some U.S. evidence to suggest that individuals are forward-looking enough to take account of life-cycle earning profiles, in choosing courses.[34] We should remember that in the

---

[31] Ministry of Education (1993) p20.

[32] PTEs do not receive a capital component in their EFTS funding.

[33] Arnold et al (1991).

[34] Berger (1988).

U.S. where fees tend to be higher, students are likely to be more sharply focused on such matters. Whether such attitudes are culturally defined and can easily be transplanted here is another matter.

- An important question is whether student myopia can be eased more readily than the myopia of the workforce planner, whom I shall discuss later. My view is that, leaving aside financial factors for the moment, we can do a lot to improve the information available to students, by addressing areas where information is weakest.[35] Information is not, of course, a free good. But students may be able to be motivated to make better use of information provided to them if they are also educated in the costs of mistakes in course choice, and are aware that it is they who, in part, will bear the consequences.

- There is a good deal of scope for lateral thinking in this area. The Careers Service offers material about jobs to school pupils at the point of leaving school, and makes available a computer database of training courses to schools and tertiary providers. Despite this, the quality of labour market information readily available to tertiary students, who may well wish to change their minds about careers and course choices, is not high.[36]

- Information could aim to shed light both on the current labour market position (e.g. areas of recent growth, relatively low unemployment), and on the outlook (sound evidence on areas of likely employment growth), without becoming too speculative or costly to collate. Better information could also be made available on the range of provider alternatives --who is offering what courses, at what prices (with quality assessments being available if possible).[37] The industry training organisations (ITOs), for example, have a role particularly with respect to the vocational/trades part of the spectrum,

---

[35] We also need to look at the extent to which remaining regulatory problems in the product market may be influencing the signals students pick up. This may for example be one reason behind the limited demand for scientific training. See West (1993, p23).

[36] Dempsey (1993).

[37] For a comment on the need for a database on science and engineering education, see West (1993), p26.

in pulling together accessible and up-to-date information on industry needs.

- Undeniably, the incentives facing students to find smart ways of collecting and using information are going to be linked to student contributions. Higher fees have meant that students are more inclined to weigh carefully the benefits and costs of their choices. This trend is already becoming apparent (as are student views about course quality). Greater private contributions also mean that we are not quite so concerned at the cost to the taxpayer when students use their human capital in overseas employment.[38]

- A critical factor in determining how far one would want to go in letting fees rise is of course the extent of the spillover benefits of tertiary level education. Bearing on this in turn is the extent to which the education or training being assisted is specific or general in nature. This will be an important area for the consultative group on funding to look at.

- An alternative to pushing harder to facilitate a funding system tied to better-informed student choice would be to separate funder and purchaser and develop an active purchasing agent arrangement analogous to the Regional Health Authorities or the Foundation for Research, Science and Technology.

WHAT ARE THE MERITS OF A PURCHASING AGENT MODEL?

- There are already some moves towards setting up purchasing agents in the tertiary sector, in particular areas. First, some Industry Training Organisations (ITOs) are beginning to contract with polytechnics for the provision of courses to meet the needs of students in 'their' industry. As yet, however, the quantum of this is comparatively small. Secondly, it is possible that an arrangement may be developed for funding some health services training courses through RHAs or a new agency.

---

[38] This practice, while undesirable (if the move is permanent) for wider social reasons as well as from the taxpayer's viewpoint, is of course impossible to prevent. The desire to stanch the flow of human capital acquired in a 'free' education system has been a hallmark of some socialist states.

- However, I suggest caution in drawing conclusions about the wider application of this approach.

- For one thing, the purchasing agent concept relies to some degree on being able to define and specify what it is that the government wishes to purchase. In the case of universities, the outputs are complicated and generally difficult to pin down. To the extent that the skills being imparted are meta-level skills, such as the ability to think critically, they are particularly hard to specify. Traditionally, of course, it has been considered that the best and perhaps only way to judge the quality of outputs in this sort of area is through peer review. Thus the emphasis on international discourse --the publishing and debating of ideas among the relevant international community, be it a community of developmental psychologists or a community of soil experts. In short, I think we have to be circumspect about applying the financial management concepts in this area without carefully thinking through the notion of an educational institution, what role it has, and what gives it integrity.

- Moreover, it would be wise to wait and assess the experience and lessons from establishing purchase agents in the health sector. I am confident that we will gain considerable insights from looking at the process of clarifying really what it is that the RHAs are purchasing, over the next few years.

- There are also some real differences between education, on the one hand, and health and public good science on the other. For example, health is strongly characterised by providers having an information advantage, and there is an unpredictability about an individual's need for health care which an agent is better placed to plan for. With public good science, there is a need for an agent to make the detailed allocational decisions on behalf of the government, once the government has established the strategic directions.

- In higher education, students have a close personal interest in resource allocation, because it affects their future livelihood so directly. Notwithstanding this, a purchase agent approach would be premised on the agent having better information than students about what sort of courses to purchase, to meet student interests and community 'needs'.

- How easy is it for the government to pull together high quality information about labour market demand and supply? The literature suggests there are no mechanisms available to make good predictions about which

particular skills will be in short supply. Typical problems are:

- only small differences show up across university faculties in surveyed rates of graduate unemployment; and

- employers typically seek employees with versatile skills (or, rather, aptitudes) and attitudes --e.g. a Wellington Chamber of Commerce 1991 survey identified key aptitudes sought such as listening, interpersonal relations, comprehension, personal presentation, self management, and speaking.

- These difficulties arise in part because the data available typically relate to the current state of the labour market and not to future developments. The further one looks forward, the less specific one can be about skill needs, and the greater the weight one is forced to place on transferable generic skills that provide a platform. Sir Christopher Ball has commented, and this applies also to initial university courses, "The function of initial education in future will be, not so much to provide the specific skills which can so quickly become outdated, but rather to teach the meta-skills needed to allow continuing education to make lifelong learning a reality."[39]

- The significant international differences in the educational backgrounds of business and other decision makers, e.g. a high number of lawyers in the U.S., and engineers and scientists in Germany and Japan, suggests that we should not be too rigid about what sort of education gives us these meta-skills, and in particular the basis for further learning.

- Other countries also seem to have doubts about going too far down the purchasing agent route. The UK has perhaps gone the furthest in this direction, trying to match student places with estimates of manpower demand, but doubts about the wisdom of doing so are widespread. The idea has also been floated in Australia[40] but has not been adopted, so far at least. International experience seems to be that the workforce planning process involved

---

[39] Hawke (1991a), p5.

[40] NBEET (1992) quoted in Clare and Johnstone (1993), p83.

tends to be costly, inflexible, and likely to be inaccurate.[41]

CONCLUSION

- In this paper I have barely touched on some very important issues. I cannot resolve here for example the conditions under which a student driven or purchase agent model makes more sense in terms of funding. In any case, we should be wary of the conceit that we can be entirely rational about such a choice. Given the complexity of the issues, we will have to learn gradually from experience. I have outlined some of my thoughts on the matter, but I am sure this will only be a small contribution to the debate on such issues.

- A preferred tertiary funding system will meet changing labour market needs and at the same time preserve the best features of the universities as custodians of knowledge and critical thinking. We have to be careful not to put at risk the quality of teaching and research in our universities, through too much emphasis on roll growth.

- any government has to think carefully before significantly changing the framework for skills development, especially considering the impact which changes may have on institutions such as universities that have long traditions and a valuable ethos and culture in themselves.

- at the same time, I agree with those such as Sir Christopher Ball who consider that it is important to keep our tertiary institutions open to those who can benefit from them --and we will have to do that if we are to keep up with the competition in the international market for skills. It will be critical then to find a way to fund increased participation without placing too much of a burden on the rest of our society and economy, and to an extent which better reflects the degree to which there are private benefits of such education.

- I am not strongly attracted to either extreme, of student choice-driven funding or a purchasing agent arrangement, though I recognise that we are currently closer to the former. But meanwhile we can't assume that our current funding system does not need nudging. There was some nudging in the last Budget, with the

---

[41] See discussion by Tony Marais (Marais, 1991, pp16, 17).

intention of giving some signals as to where the Government saw a case for growth at the margin. In part, these signals were based on the Government's strategic view of the economy. The priorities identified as relevant in relation to the discretionary 1994 increment in tertiary places (approximately 1%) are, for example, clearly linked to supporting the science and technology base underlying New Zealand's primary and secondary industries and, more widely, to sustaining the economic growth we are now seeing.

- There may be a case for funding scholarships to address the issue of an adequate breadth of participation in universities, if the data suggest that old patterns are not changing. There is also a case for looking at the funding of post-graduate study to ensure that we are giving adequate encouragement to excellence, through means such as scholarships.

- My own view is that there is also a case for looking again at the widespread assumption that the state can continue to provide large subsidies for costly vocational or professional courses, to the extent that the returns are substantially private. In Canada and the U.S., specialised programmes such as medicine and dentistry command higher fees.[42] The issue is the extent to which the spill-over benefits of specific vocational and professional courses are less than the benefits from more general courses with a higher component of meta-skills. The traditional alternative to higher fees in these areas is of course more restricted entry, but that approach has questionable effects in terms of both equity and efficiency.

- In thinking about possible changes to current arrangements, we should be as clear as possible about the reasons for and likely consequences of any adjustments that we make.

- We need to give particular attention to whether the current funding, governance and regulatory systems allow and encourage universities to be responsive to changing labour market needs; whether students' course choices are likely to be sensitive to the fees they pay; and whether there are not some sensible steps to take to ensure better labour market information is provided to students to facilitate more informed choice.

---

[42] Marais (1991) p21.

- Until we have better systems in place to provide relevant information, and while universities are adapting to a relatively new environment and its implications for their governance and their responsiveness, the Government will need to retain some role in conveying priorities to tertiary institutions and influencing the sort of choices that are made at the margin.

--oo--

Acknowledgement

I should like to acknowledge the considerable expenditure of time and effort by Dr Ralph Chapman in pulling together the material for this paper and providing a spirited in-house debate as it has taken shape.

S.U.

REFERENCES

Allington, N & N O'Shaughnessy (1992) **Light, Liberty and Learning: the Idea of a University Revisited** The Education Unit, Surrey, UK.

Arnold, R, P Berry, C Burton & C Wareham (1991) "Recruitment of students to the Central Institute of Technology: the Effectiveness of Careers Advisers in the Wellington Region." **CIT Business Analysis Report** BAUD 854. October.

Berger, M (1988) "Predicted Future Earnings and Choice of College Major" **Industrial and Labour Relations Review**, 41(3), April.

Boston, J (1988) **The Future of New Zealand Universities: an exploration of some of the issues raised by the Watts Committee and the Treasury** Wellington: Institute of Policy Studies.

Brownlie, A (1993) "End is nigh in cost saving at varsities".**New Zealand Herald**. 28 June.

Clare, Ross & Kaye Johnston (1993) **Education and Training in the 1990s**, Economic Planning Advisory Council, AGPS, Canberra, August

Dempsey, E (1993). Chief Executive, Careers Service. Personal communication.

Hague, D (1991) **Beyond Universities. A New Republic of the Intellect.** London: IEA.

Hampl, M (1993) **The Economic Impact of Labour Force Training** Parliamentary Library Background Paper. September.

Hawke, G (Ed.) (1991a) **Sharks and Splashes: The Future of Education and Employment**. Lectures by Sir Christopher Ball. Wellington: Institute of Policy Studies.

Hawke, G (Ed.) (1991b) **A Modest Safety Net? The Future of the Welfare State.** Wellington: Institute of Policy Studies.

Hawke, G (1992) **Carrots for Donkeys? A Commentary on the Interim report of the Tertiary Capital Charge Feasibility Study Task Force** 30 November.

Johnson, P (1991) "Is your journey really necessary, professor?" **The Spectator.** 7 September.

Lewis, R (1991) **Privatise the Universities** Economic Affairs, Nov.

Lucas, R (1993) "Making a Miracle". **Econometrica** 61(2). March. pp251-272.

Marais, T (1991) **Education and Training: Rational Decision-making for Students and Society**. In Hawke, G (Ed.) (1991b).

Ministry of Education (1993) **Education for the 21st Century. A Discussion Document**. Wellington: Ministry of Education. 22 July.

NBEET (1992) **Post-compulsory education and training: Fitting the Need**, National Board of Employment, Education and Training, AGPS, Canberra, November

NZVCC (1992) **Graduate Unemployment in New Zealand 1992. A Summary of Destinations**. Report for year ended 31 May 1992. No 19. Wellington: New Zealand Vice Chancellors Committee.

OECD (1993) **OECD Economic Surveys 1992-1993: New Zealand** OECD, Paris.

Patterson, G (1991) **University 'Reform' in New Zealand 1984-1990: Policies and Outcomes** 'Access'.

Richardson, Hon R, Minister of Finance (1992) **Economic Strategy**. B6 (Pt II). 2 July.

Richardson, Hon R, Minister of Finance (1993a) **Economic and Fiscal Outlook 1993**. B6A. 1 July.

Richardson, Hon R, Minister of Finance (1993b) **Pre-Election Economic and Fiscal Update**. 5 October.

Smith, A (1993) "In-house 'degree' plan on the cards". **Dominion**. August 4.

Smith, Hon Dr L (1993) **The National Party's Education Policy**. Wellington: N Z National Party. September.

Snook, I (1991) "Policy change in higher education: the New Zealand experience". **Higher Education**, 21, pp621-634.

Tertiary Review Group (1991) **Review of the Structure of Tertiary Institutions**. Wellington.

West, A (1993) "The Challenge to New Zealand Science and Technology". Unpublished paper. April.

World Economic Forum/IMD (1993) **The World Competitiveness Report 1993** 13th ed. Geneva/Lausanne: World Economic Forum and IMD International. June.

ANNEX 1

DATA ON QUALITY OF NEW ZEALAND LABOUR AND MANAGEMENT
FROM WORLD COMPETITIVENESS REPORT 1993

TABLE 1 : INDICATORS OF THE QUALITY OF LABOUR
0 = LOW 100 = HIGH

	Skilled labour (1)	Qualified engineers (2)	Worker motivation (3)	Receptiveness to learning (4)	Education (5)	Training (6)
NEW ZEALAND	58	66	53	60	47	51
Australia	67	73	48	55	52	66
Canada	56	67	50	60	39	40
U.K.	52	46	49	56	31	44
Japan	57	57	80	76	75	87
Germany	59	66	61	58	70	73
Denmark	78	85	69	71	64	70
Sweden	67	67	61	63	56	64
Switzerland	55	55	64	58	69	70
Singapore	56	64	63	70	79	71
Taiwan	58	59	59	74	79	64
Korea	50	50	62	61	53	70
Malaysia	45	51	59	65	56	64
Thailand	35	27	53	59	33	55

(1) Extent to which skilled labour is easy to get in the economy.
(2) Extent to which there are enough qualified engineers on the market.
(3) Extent to which workers identify with company objectives.
(4) Degree of willingness of employees to learn new skills.
(5) Extent to which education meets the needs of a competitive economy.
(6) Extent to which companies invest sufficiently in training employees.

Source : World Economic Forum/IMD (1993).

TABLE 2 : INDICATORS OF THE QUALITY OF MANAGEMENT
0 = LOW 100 = HIGH

	Competent senior management (1)	Management initiative (2)	International experience (3)	Intercultural understanding (4)
NEW ZEALAND	46	57	50	49
Australia	49	52	51	42
Canada	55	55	55	51
United Kingdom	47	52	62	41
Japan	50	67	56	49
Germany	57	60	68	68
Denmark	64	68	73	73
Sweden	66	66	74	72
Switzerland	55	64	74	77
Singapore	62	61	68	71
Taiwan	55	77	64	68
Korea	50	50	53	55
Malaysia	56	70	63	72
Thailand	39	68	63	54

(1) Extent to which there are enough senior managers on the market.
(2) Sense of entrepreneurship and innovation of managers.
(3) Degree of experience in international business of senior management.
(4) Degree of understanding and knowledge of foreign cultures and languages.

Source : World Economic Forum/IMD (1993).

Keynote Presentation: **"The Labour Market and the Universities"**
Hon. Simon Upton, Minister of Research, Science and Technology

Questions/Discussion

The Hon Simon Upton, Minister of Research, Science and Technology, was asked questions on the following subjects:

- Should more information about education and career options be available to young people making career decisions?
- Could and should the Government be more involved in ensuring the quality of education?
- Should the cost of a course be allowed to be a factor in student choice?
- Should scholarships be introduced for students in four-year programmes? and
- Should student allowances be restored so that they represent a living allowance?

In formulating the questions, participants raised the following issues:

Information

New Zealand has a good education system; however, students are not always given enough information to allow them to make the "best" choices (e.g. there are 17 nursing schools because young people consider nursing to be a good career option not because 17 nursing schools are required to fulfil demand for nurses). More information about education and career options should be available to young people.

The influence of course cost on student choice

The current Study Right system means that science courses are expensive, particularly for four-year degree programmes. Under Study Right, the fourth year is subsidised at a lower rate. Course cost, therefore, becomes an unwelcome factor in student choice.

Should scholarships be introduced for students in four-year programmes to help them cope with the additional costs associated with a fourth year of study?

Allowances

Overall, student enrolments have not been adversely affected by increased tuition fees, although there may be adverse impacts on Maori, Pacific Island and women students and students with disabilities. With the erosion of student allowances, however, living costs are now seriously impinging upon tertiary students and are likely to affect future enrolments.

In responding to the above questions and issues, the Minister made the following comments:

Schools should provide young people with more information about career options, life skills and societal knowledge. Senior secondary schools, in particular, should have links to industry and tertiary institutions. Students should be taught "meta-skills".

Institutional autonomy, including the right to compete, plus independent student choice mean Government intervention may be inappropriate. The present funding system has, however, made tertiary institutions more concerned with recruiting students than equipping them for the job market.

There is a problem in attempting to define quality measures. Quality of research is more easily identified than quality of teaching. The quality of teaching suffers as a result of academic staff becoming increasing involved with administration, especially at the senior level. Perhaps universities could follow the Crown Research Institute (CRI) model and develop dual career tracks for administrators and teachers?

Fiscal constraints at the time the Study Right system was implemented were responsible for the decision by Government to restrict Study Right to a three-year entitlement.

Cost does not appear to be acting as a deterrent to students entering into postgraduate study. The Vice-Chancellors' Committee reports that postgraduate student numbers are growing.

It is questionable to what extent fees influence course selection. Students do not appear to be seriously price- sensitive at the moment.

The Government assumes that students will receive support from their families or they will borrow money through the student loans scheme. People should and do view tertiary education as a life-time investment. The National Government has recently established a Ministerial Taskforce to assess the private/public benefit of tertiary education.

Do not cite without permission of the authors.

NZCER AND AUSNZ

SEMINAR : THE LABOUR MARKET AND THE UNIVERSITIES

October 14th 1993
NZCER Council Room
Wellington

EDUCATING HIGHLY SKILLED LABOUR : DEMOGRAPHIC ASPECTS OF THE CONTRIBUTION OF THE UNIVERSITIES

by

Ian Pool and Lisa Davies

Population Studies Centre, University of Waikato

GENERAL CONSIDERATIONS AND UNDERLYING ASSUMPTIONS

This paper is not a theoretical or substantive treatise on the contribution of universities to labour supply. Its intention is rather more modest: to identify, and if possible to measure the number of people being trained at this level, and to suggest future trends. Nevertheless, an information base without any attempts at interpretation is rather sterile, and we have preferred to step beyond the simple trends and thus to start to develop a knowledge base. Any essay of interpretation, however, brings into play the author's own subjective views and assumptions, and these should be outlined so that the reader is aware of them.

Firstly, we accept the view of the Cabinet Committee on Training and Employment, 1987, that

> "There is a relationship between the economic performance of a country and the importance it places on education and training ... countries who (sic) put most into developing a well educated and highly skilled workforce earn higher incomes and have a better standard of living;..."

Lester Thurow, the MIT economist (1993), sees a lack of understanding of this issue in the United States as a

> "fundamental failure in Reaganomics. It did not see that the world had shifted from classical comparative advantage [natural resource endowment and capital - labour ratios].... to man-made comparative advantage where brainpower industries are central to success... Amid recessionary pressures of the early 1990s, nothing [in the US] was being cut more than education."

Secondly, and in line with this view, we thus believe that tertiary education contributes to the public good. More particularly, we are concerned that the shift from that philosophy to the current attitude, that argument that education is of private benefit, and thus that those who benefit from it should pay for it, occurred so rapidly that New Zealand parents and students had no time to save for this eventuality. But even if the phasing-in had been gradual, there would still have been problems: there must be real questions about shifting tertiary education costs to the consumers of these services or their parents. Current thinking, in our view, is seriously flawed and against national best interests. It is Thurow (1993) again, who outlines our position succintly and forcefully:

> "No hard-nosed capitalistic parent would invest in 16 years of education for their children. There just isn't any way that an investment that takes 16 years of spending before any returns are generated can be made to pay. Yet if everyone makes such investments, society gets an enormous pay off...."

Thirdly, we also acknowledge with concern the New Zealand's Cabinet's view in 1987 that,

> "Although it has grown ... in the last two decades, the number of students going on to further education and training in New Zealand is still low by comparison with other countries".

The situation has improved since then, and since the date when the Vice-Chancellors' Committee published a report commissioned for the Watts Committee, and prepared by us (Pool & Davies, 1987). Nevertheless, participation rates at the "core" age-group (18-24 years), composed of the majority of students, who come straight on from school into University, and who thus play the central role in the initial "skilling" of the workforce, remain low. In 1991, and in the projections to be presented here, these rates are, and will still be in 2006 at the end of our time series, well below, for example, those already achieved in the 1980s for Ontario, when it was comparing itself unfavourably with the more developed American states.

Fourthly, we accept that our model for the sort of tertiary participation patterns which might sustain the skilled labour market of the 1990s is a North American one. Their structures, entirely public in Canada since the last private colleges joined Provincial sytems in the 1960s, and mixed, but predominantly public (78 per cent in 1986, US 1990, Table 256) in the United States, approximate ours. This is particularly true for Ontario. North American systems have been able to stimulate much higher levels of participation, and also, as an output, have the skilled labour force this produces, although even they are perceiving skilled labour shortages.

METHODOLOGICAL ISSUES

On a more technical plane, we must note that the projections, which form an important component of our paper, are dependent not on the sophistication of mathematical techniques, but on the assumptions built into them. Of course, these assumptions should be based on identifiable trends, and here statistical analysis is critical. But international experience in demography has shown that the simple "component techniques", particularly those based around cohorts, yield better projections than do the seemingly more powerful mathematical techniques. To quote the leading methodological text (Shryock & Siegel, 1976. p.443):

> "Mathematical methods are now much less frequently employed to estimate the population ... Component methods have been displacing the mathematical methods".

The reasons for this are straightforward. We are dealing with human populations, subject to whims and changes, and thus there is a need to build into the projections an intuitive feel for what is happening.

Our projections will be based on a modified component technique; "modified" because the data sources are highly inadequate, and thus we have not been able to do perfect cohort time series analyses, either historically or projected. This point should form the basis for an important conclusion for this seminar -- the need to improve data sources for the analysis both of training and of the skilled labour market itself.

The assumptions around which the projections have been constructed, are derived empirically from an analysis of trends in the 1980s and early 1990s. The first, and longer part of our paper sets out the factors which historically have driven university participation. These then allow us to project forward on the basis of observed patterns.

HISTORICAL TRENDS

Participation Trends

Tertiary enrolments increased gradually through the 1970s and early 1980s. Then growth started to accelerate in the the late 1980s, but was to drop in 1990, to spurt in 1991 (Figure 1), and then to decelerate since (Figure 1). The gross figures, however, conceal trends, the understanding of which are very significant for any evaluation of the sustainability of enrolments in the training area most needed for the "upskilling" of the labour market. The improving of skills depends, at least under present conditions, on the output of young professional and technical workers, aged in their mid-late twenties.

Our earlier study and recent Ministry data show that through the 1970s and first two thirds of the 1980s there was little change in the rates for full-time males at core ages, against a steady increase for women, and thus there was a narrowing of the gender gap. There were also few changes at the core ages in part time rates. Against this there were massive increases in extramural rates (Pool and Davies, 1987, Chapt 2).

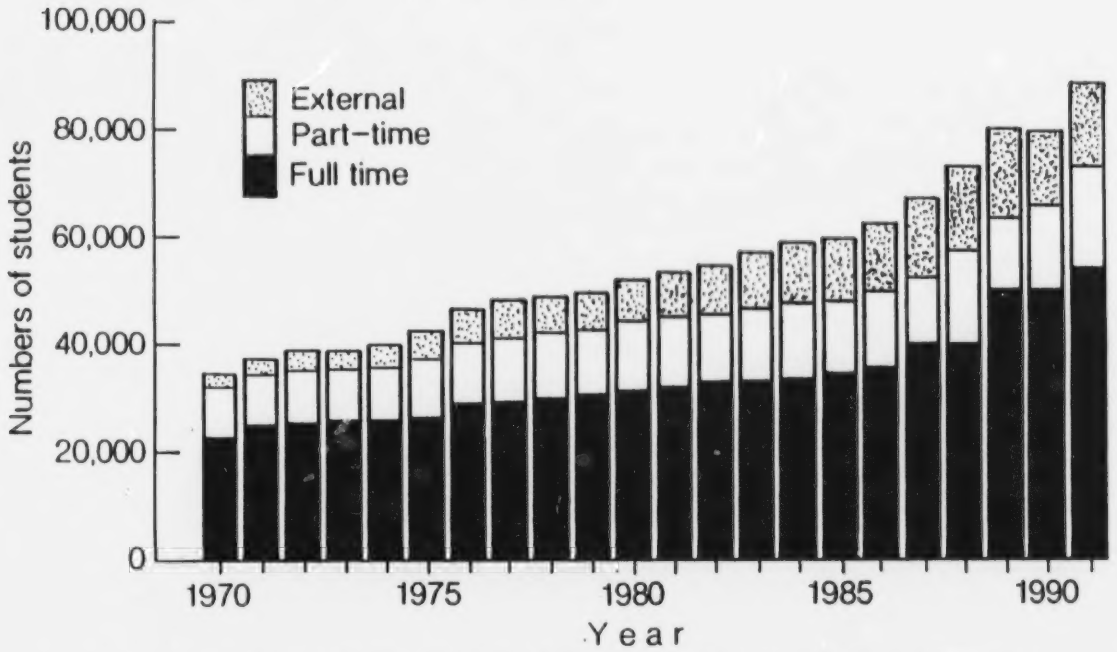
Recent data point to some improvements in core full time rates since 1986, even in 1990 when tertiary fees were introduced. For the part time and extra-mural components, there was a drop in numbers that year, but much of the growth in the entire system since then has come from a recuperation of their rates towards 1989 levels Bathgate and Pole, 1990).

This said, however, attention must also be paid to age specific participation rates in external student categories. Our earlier analysis of this (1987, Fig 2.4) showed that rate changes for this category had a rather different path from the review of simple numbers. Whereas numbers of extramural students had gone through extraordinary growth, rates had actually plateaued. We do not have absolutely comparable data available in the Ministry publications, but where categories are similar (eg extra-mural at 18-24 years) this plateauing seems to have continued. Clearly this identifies a need for a more refined analysis of participation trends by this very important student group.

A refined analysis of the contribution of universities to the skilled labour market requires recognition of these distinct paths. We strongly believe in the principle of access for mature students, whether full- or part-time, or extra-mural, for the experiences these people bring into their tertiary studies, combined with the upgrading of their qualifications will be of benefit to the entire society. Nonetheless, for the economy to be "upskilled" systematically, there must also be a steady and proportionately increasing flow of persons into full-time core study. The historical data show that this flow has fluctuated, and at times in the recent past increases in numbers were probably due more to purely demographic changes (see below) than to real and sustainable growth.

Moreover, total university participation rates themselves depend primarily on the enrolment at ages 18-24 years, of full-time students who will complete their qualifications in the shortest, and most cost efficient way. Levels at other ages and part time study are very important in the planning of the system (eg for timetabling or curricula suitable for mature students), and, as we have shown, have had an impact on patterns of growth overall. Equally well, one may argue that, in the future, reskilling throughout the career cycle may,

Figure 1 University Summary Statistics, University Enrolments by Type of Attendance, 1970–1991



Source: Demographic and Statistical Analysis Section, Ministry of Education

and should, increase the number of older students, a factor even showing up in our trend based projections. But ,the reality is that, for the foreseeable future, the majority of students will be in this narrow age band (55 per cent in AD 2006) at 18-24 years, which we term the core ages.

In reviewing the structure of university participation in the mid 1980s (Pool & Davies, 1987), two other points stood out. Firstly, New Zealand not only had lower participation rates, but its levels of advanced study, masters level and higher, fell well below general OECD levels. Given that our students often start their first degrees at younger ages than do their overseas peers, this points to a tendency towards premature, as well as lower qualified graduates. Secondly, part-time study seemed more prevalent here than overseas. This raises questions about the efficiency of our approach as a mechanism for accelerated training.

If there is felt to be a need to address these issues, a further point must be taken into account. For many specialised areas of training in some of the professions, and in science and technology, periods of study and training are very long. For example, the newly graduated medical consultant of AD 2006 will probably need to be a first year undergraduate already. This point has implications for all aspects of this labour market.

Factors Driving Core Enrolment

Enrolments at the core ages are driven by three immediate sets of factors (there are few data to analyse more remote determinants, such as community attitudes to higher education):

- The age structure of the population, and particularly the occurrence of "youth surpluses" or "youth deficits" (at ages 15-24; this draws on the terminology of the CIA !);
- The levels of retention through high school, which, of course, are virtually the only route of direct entry into the system;
- Progression from high school into university within a short time of completing 6th or 7th form.

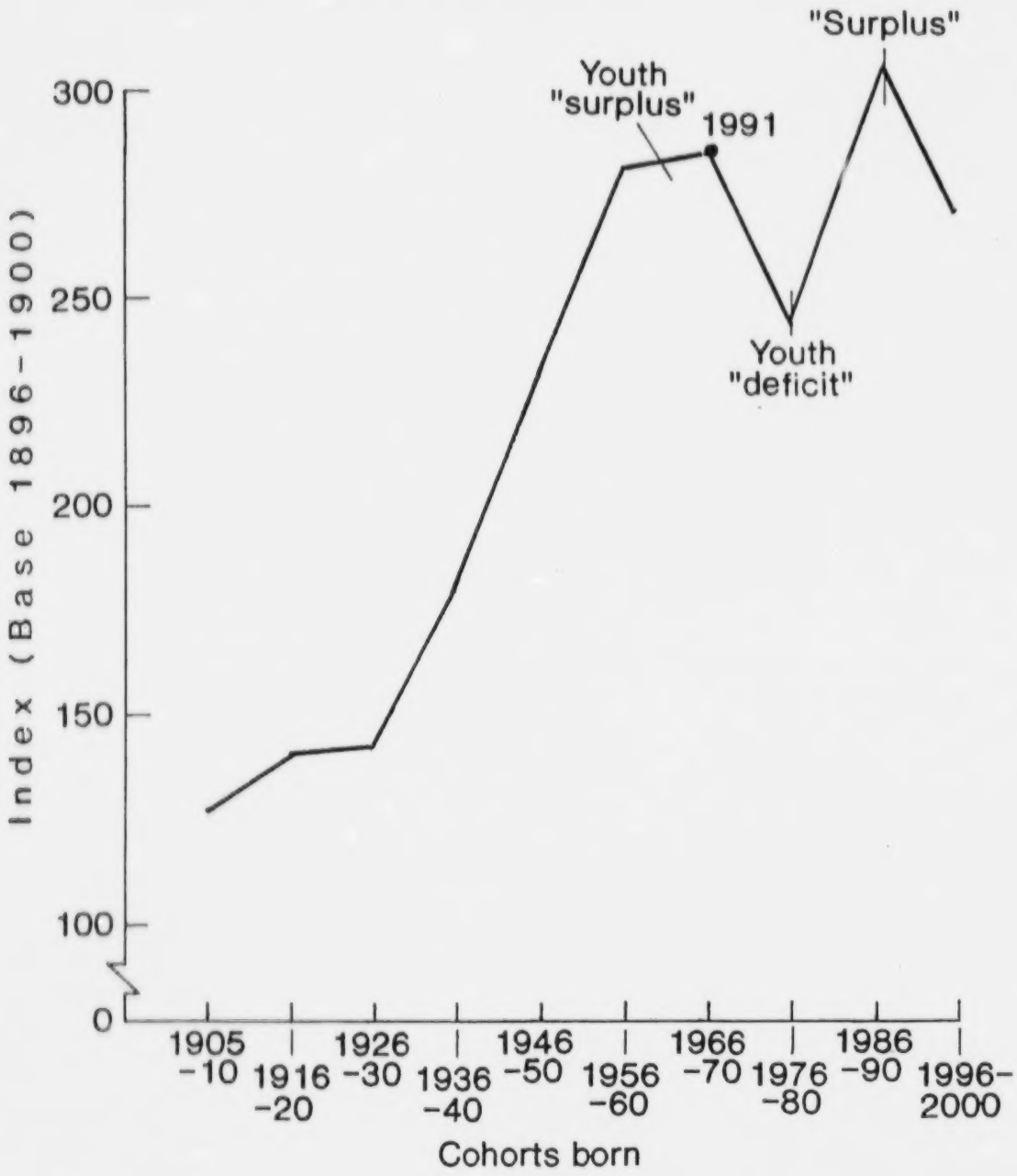
Growth of the Youth Population

The changes in the size of the youth population over the decades until the 1991 census strongly favoured systematic increases in the number of university enrolments, as is clear from Figure 2. There was a steady increase in the size of each cohort reaching the core ages, producing the marked youth surpluses of the 1980s, which were to have a significant impact on youth unemployment as well as tertiary education. The changes starting in 1991 will be covered when discusssing the projections.

Senior School Retention: National Trends

For every hundred third formers who entered secondary schools across New Zealand in 1979, some 54 remained in school until their sixth form year (Table 1). Ten years later, some 83 out of an original 100 third form students could be expected to enter into their sixth

Figure 2: Changes in the Size of Birth Cohorts when they Reach 15-24 Years (i.e. Enter the Work-Force)



form year. At the seventh form level, secondary school students are three time as likely as their peers in the early 1980's to reach the final form level at secondary school. Table 1 shows the three fold increase in seventh form retention rates from 16 percent in 1982 to 45 percent in 1992.

Table 1 - New Zealand secondary schools: Senior school retention rates 1987-1992

	Form 6	Form 7
All students		
1982#	53.7	15.6
1987#	56.8	23.6
1992#	82.9	44.1
Maori students		
1982#	24.5	3.8
1987#	28.5	6.9
1992#	60.7	21.8

Sources:
 # "Education at a Glance", Ministry of Education, Wellington

Improvements in Maori senior school participation have been even more dramatic, with the sixth form retention rate more than doubling over the past five years from 25% in 1987 to 61% in 1992. Maori retention rates to form seven have increased fourfold from 4% in 1987 to 22% in 1992. While these increases are indeed significant, it is important to note that Maori students are still far less likely than their peers to reach the senior secondary school (Davies, 1993).

While this may seem satisfactory, to assess the real impact of gains in Maori participation and attainment at the secondary level, there is a need to consider equivalent gains made by the non-Maori population. While increases in retention have been highly signficant, Maori students are still less likely than their non-Maori peers to remain in school to senior form levels. Moreover, there has only been a slight reduction in the gap between Maori non-Maori retention rates to form 6. In 1981, the non-Maori retention rate to form six was 35 percent age points higher than the equivalent Maori rate. Over a ten year period, during which the Maori retention rate more than doubled, the advantage of non-Maori relative to Maori declined only to 27 percentage points.

Indeed, at the seventh form level, the gap between Maori and non-Maori retention rates is widening. This is despite the six fold increase in the proportion of Maori remaining in school to form 7.

Progression to University

Vere-Jones and his colleagues at Victoria University analysed a long time series of probabilities of transition from the fourth form to internal core entry to University (Reported Pool & Davies, 1987, p. 34). For the largest, and most critical group, entry to full time, the probabilities for males remained virtually unchanged from 1965 to 1985, at just above 10 per cent. In fact, the probability for 1970 was as high as those reached in the early 1980s. For females there was, by contrast, a steady improvement.

Directly comparable data do not appear to be available for the late 1980s and 1990s. However, results from a more refined but shorter term analysis by the Ministry of Education are presented in Table 2. These show slight gains in progression, but less than those achieved in secondary school retention. While the retention of girls significantly exceeds that of boys, the progression rates are closer.

Table 2: Seventh form Retention Rates and Progression to University: Proportion of School Leavers who directly entered tertiary institutions in 1991 and 1992

	Form 7 retention rate	School leavers entering Uni
Male		
1991	37.8	20.2
1992	41.2	21.2
Female		
1991	42.1	21.7
1992	47.2	23.7

Sources: 1991 figures - Sturrock (1993).
1992 figures - unpublished data Research and Statistics Division, Ministry of Education, Wellington
Retention rates, Ministry of Education, (1993).

Moreover recent data (1993), in Table 3, suggest that the gains may not have been sustained. These national data in Table 3 are supported by a longer term analysis (1987-1992) carried out at the University of Waikato. The senior secondary school is the primary source of recruitment for the University of Waikato, with 59 percent of first year students in 1991 attending secondary school directly prior to entering university.

Table 3: Progression rates (per cent), all students directly entering University

1991	21.0
1992	22.4
1993	20.5

Source: Ministry of Education (various dates).

Over the five years, 1987-91 there was a 75 per cent growth in the size of the pool of sixth and seventh form students in the Waikato district, yet only a 50 per cent increase in the number of students entering directly into Waikato University.

It is important to note, that Waikato seventh form students are no more likely than their peers five years ago, to enter directly into the University of Waikato. In 1991, there were almost 3,800 seventh formers attending schools in the Waikato catchment district. Of these, just over 900 entered directly into the University of Waikato in 1992 - a school-university progression rate of 27 percent. But the comparable figure for 1987 had been 29 percent (approximately 600 out of 2,000 seventh formers).

These data are given in Table 4. It also shows that greatly improved Maori retention has not been accompanied by gains in progression.

It can be concluded then that while students are more likely to be retained to senior form levels, they are in fact slightly less likely than five years ago to enter directly into University. Thus recent growth the in number of direct entrants to the University of Waikato, and nationally, has come more from improved secondary school retention, and not from improved progression rates.

Table 4: Secondary Retention and Progression Rates (per cent), Waikato University District, 1987 & 1992, All Students and Maori Students

	Retention	Progression
All students		
1987	23.6	29.0
1992	44.7	26.6
Maori students		
1987	6.9	26.5
1992	22.0	25.8

Calculated from a seventh form base

Source: Davies, L. & Pool I., (1993), "Paetawhiti", Report prepared for University of Waikato, Hamilton. Acknowledgement is made to the Academic Registrar for permission to quote from this document.

Table 5 provides further insight into the recent trends in senior school participation. It shows that despite a 69 percent increase in the number of seventh formers in New Zealand secondary schools, there has been an actual decline in the proportion of students enrolled in the core subject areas likely to be carried across to University: english, biology, chemistry, physics, maths with calculus, and maths with statistics.

Table 5: New Zealand Secondary Schools: Percent of Seventh Form Students Enrolled in Core Subject Areas, 1987 and 1992

Core subject	1987	1992
English	78.2	74.9
Biology	41.4	36.8
Chemistry	34.4	24.6
Physics	31.4	25.0
Maths with Calculus	48.3	41.1
Maths with Statistics	61.0	53.2
Total seventh formers	14626	24678

Without national time series data it is not possible to make definitive statements about the nature of school to university progression. However, these data given above provide little support for any suggestions of a greatly increased flow between the senior school and universities.

Non-Core Students

Finally, it will have been noted that little attention has been paid here to "progression" rates for non-core groups. In part, this is because such analysis is very difficult, as their enrolments are more likely to fluctuate in response to the effects of endogenous factors (eg fees), as well as exogenous (eg changes in employment opportunities) than seems to be the case for internal full time students. At the same time, the ebbs and flows in enrolments among these people have a significant effect on the entire system, and thus must be made the subject of serious analyses. This will become even more urgent if New Zealand skilled labour markets become more proactive and encouraging to persons wishing to reskill, or to move laterally. In our projections we use past trends in internal non-core enrolments, including their fluctuation, to build this component into the projection.

We have not, however, had the capacity to analyse external enrolment trends. This component may be even more subject to sudden shifts than are other non-core students.

Past Trends: Implications for Projection Assumptions

It seems that much of the potential for growth in the number of core students may now have been exploited. Of particular significance may be the lack of further growth from progression. This means that all projections of future student populations must take account of this factor: linear models based on past enrolments will be very misleading. Nor can projections be based on simple quantitative extrapolations from the number of school pupils aged, say, 16-18 years, for it is the qualitative effect of the courses taken at the late secondary ages which appears to be emerging as a more important factor.

It can be argued that much of the recent growth in number of "direct entry" first year university students can be attributed to numerical growth in senior school enrolments rather than increased likelihood of young people pursuing university education. This is a critical finding because once the current effects of falling rolls in junior secondary school forms, a result of simple demographic decline (lower fertility in the early 1980s), flow through to the senior school, there will be a numerical reduction in the captive pool of senior school students - currently a key source of recruitment for the university. Moreover, this slowing of senior school numerical enrolment growth, resulting from demographic factors, may be compounded by a "levelling out" of increases in senior school retention rates. Thus the falling secondary junior school rolls, currently being faced by secondary schools, will soon flow through to senior form levels and be extended to the tertiary sector in the near future.

Put most starkly, projected declines in the size of 18-24 age groups in the 1990s, signal a potential further demographic threat to the continued expansion of the student University body. Moreover, as well as creating a smaller pool at core ages to recruit from, the future reduction in 18-24 age groups may lead to a "youth deficit", which may create a greater range of employment options for senior school students than that currently available, and these jobs may be a more compelling attraction than attendance at University. The latter would be the less attractive option as it could have uncertain employment outcomes, and, for most students, the certainty of heavy loan repayments.

Staffing

In our earlier study (1987), using the only available data, the AUS Staff Survey, we drew attention to the fact that academic staff were likely to be male, concentrated at mid-career, say 35-49 years. We found it very difficult this time round to obtain data on staffs by gender and age, and coded in conventional ways. Once again, a recommendation must be to improve the collection coding and analysis of data, in this case for teaching staff.

For the present analysis, University Registries kindly forwarded data which essentially show a systematic upward shift in age from those we had discussed for 1987. Today one-third or more of staff are concentrated around 40-54 years, which means that, from the turn of the century, the universities are going to be faced with mounting superannuation,

recruitment and replacement costs. Quantitatively, this big block of retirements will mean, that, unless replacements are found, the already severely disadvantageous staffing ratios (1:17, as against about 1:14 in Canadian Provinces) will become even worse and this must eventually affect the quality of the degrees being offered.

Qualitatively, this will also mean that, unless human resource management is more carefully handled than has sometimes been the case in the past, we will see the reinstitution of the 1960's cycle of the recruitment of large numbers of relatively junior staff. These persons will then age over the following three decades, and will retire at about the same time, thus perpetuating the demographic effects first introduced in the 1960s. Careful preparation to avoid this will have to take account of the long lead time needed for the training such highly specialised workers.

FUTURE TRENDS

Determinants

As Figure 2 shows, from now on because of demographic trends, the analysis and forecasting of the training and labour force entrant components of the skilled labour market, will be far more complicated . Over the 1990s, New Zealand will shift from a "youth surplus" to a "youth deficit", and then, in the early years of next century, will swing back to another "youth surplus".

One has good cause to be rather pessimistic about the policy-making implications of these radical swings. This is for the following reasons:

- We are currently in an era when the notion of public sector planning is viewed negatively by policy makers and by many analysts. Thus, the longer term planning necessary to meet the radical shifts in population composition, a change far more urgent than the far more publicised factor of aging, seems an unlikely prospect.

- There is also the widely held view that advanced training is for private rather than public good, a view often, and rather paradoxically held by those very persons who are calling for upskilling for the nation's benefit. As we noted at the beginning, we accept Thurow's view on this issue.

- At the same time the labour market may, over the medium and longer term, require skills whose bases must be being laid now; any sudden upsurge in demand for specialists requires perhaps five or more years to recruit those with basic advanced training, and to educate them to to enter the labour market.

- We have not yet reached anything like the University participation levels seen by the more successful economies in the OECD overseas.

- The analysis of past trends shows that, at least for the short term, the flow through from the secondary into the university sector will not be increased.

- Moreover, the history of planning in the decades up to the 1980s, when growth in the core ages was one of systematic increase, is not reassuring in terms of what it might suggest about the future: although the youth of the late 1980s had been with us since 1966-71, and had therefore been counted in censuses over the preceding years, their arrival at tertiary educational or labour market ages was either ignored or, at best, seems to have come as a shock to policy makers.

- Finally, if, for demographic reasons, enrolments stagnate there may be a temptation by central government to "downsize" or "rundown" facilities over the coming decade -- one wonders whether some recent policy initiatives by Cabinet might not have had that in mind. One suspects that, if this occurs, it will be very difficult to get policy makers to "upsize" and improve rundown facilities in time for the next youth surplus, particularly if it is recognised that the planing and execution of these will frequently take at least five years. University capital assets have already seen the negative effects of capped budgets in a period when rolls have been booming.

For some commentators, the easy, indeed simplistic, answer to these problems is immigration of the highly skilled. It must be recognised that for some areas of the labour market this is, and will remain, the only possibility. We must also stress that we are not opposed to immigration per se, but we must also ask whether it is a better, or more cost efficient, alternative to training our own:

- New Zealand will not be alone in facing a youth deficit, and an attendant shortage of young skilled workers --- the CIA has identified this for all of the west European, North American, Asian Tiger and Australasian economies, and argues that it will have major economic and political implications. Indeed, these overseas destinations are, and will be, attractive to our young highly skilled.

- Recruitment of highly skilled and highly mobile labour is difficult:

    - even when successful, Australian experience has shown that it takes much longer than is generally believed (verbal report on research, Trans-Tasman Migration Seminar, Waikato University, Sept. 1979);

    - we will be competing in this market against more powerful and wealthier economies, and thus we may have to distort income patterns (for the same position, far higher salaries for overseas than for locally recruited personnel), or accept that we must hire at the bottom end of the market;

    - highly skilled labour is also highly mobile, and it must be recognised that the overseas recruited workers have no inherent commitment to New Zealand.

- There is also the not unimportant issue that, by the time they reach university, we have already invested heavily on our youth.

Young New Zealanders may, in fact typically will, go overseas for greater or lesser periods, but until recently felt the sort of commitment to New Zealand that, all other things being equal, would draw them back. The rough passage undergone by the cohorts

born around 1970, by comparison with their immediate predecessors (born 1951-65), may mean that we have a current University aged cohort, significant proportions of whom are embittered by their experiences. They have had to contend with overcrowded primary, intermediate and secondary schools, but they then ran into a university system being rundown. Not only did they meet huge classes and decreasing access to facilities at university, but they have been faced with the introduction, without adequate warning, of fees, and the slashing of student allowances, plus student loans, the lack of summer jobs, and, after that, no guarantee of employment. Not only might we run into problems, therefore, in recruiting overseas skilled workers, but more importantly we might have difficulty retaining our own, who may well be attracted overseas to fill skilled labour shortages there.

To conclude we are faced with a situation where conditions are not favourable to a growth in participation rates, but where the recruitment of skilled labour by immigration is likely to be problematic. We now challenge you to analyze this and suggest responses.

Projected Trends

Taking into account the qualitative as well as quantitative points we have outlined earlier, we have computed projections based on trends in the 1980s and early 1990s, including the building in of factors such as progression. These are conservative estimates, but are derived from empirical data, not speculation. The historical trajectory for participation, from which they are extrapolated, was one of slow growth, then a spurt to the early 1990s, and then virtually no further acceleration. The justification for this last assumption is largely qualitative: essentially, the perceived decline in the feeder role of secondary schools.

The key points in Table 6 are as follows

- Overall growth will be slow. This must be of concern for skilled labour market policy.

- There will be decreases in participation at the core ages.

- There will be a slight crossover in gender patterns overall, with more women than men at the end of the projection period. But what is worrying will be the fact that the sex ratio at the core ages, 105 male: 100 female in 1991, will increase to 109 : 100. Remember that this is the major recruiting ground for our professions, for which gender equity should be an important feature.

- The student body will age, with declines at ages 18-24 and 25-44 years, but increases at 45+. In this context it must be reiterated that these are conservative projections, with no allowance for scenarios of increasing reskilling of mature workers.

- These projections suggest that the retention-driven increases around the late 1980s should not be taken as indicators of a strong growth in the 1990s. In fact, the student numbers (internal) projected in this analysis for 2006 fall below the projections we computed earlier for the Watts Committee (1987), then assuming an increase in

participation at core ages to only 15% by 2007. We noted then that to reach "medium" growth (17% by 2007 - the level Ontario had already reached by 1985-87), "... it will be necessary to make some policy interventions". Clearly, our earlier comments still hold true.

Table 6: Projected University Enrolments 1996-2006: Internal Students by age and gender

MALE

Year	17	18-24	25-44	45+	Total
		ages			
1996	190	24811	8083	2166	35250
2001	191	22824	8228	2394	33627
2006	212	23748	7948	2657	34565

FEMALE

Year	17	18-24	25-44	45+	Total
		ages			
1996	267	22966	8077	4226	35536
2001	266	21076	8252	4663	34257
2006	299	21854	7981	5183	35317

TOTAL

Year	17	18-24	25-44	45+	Total
		ages			
1996	457	47777	16160	6392	70786
2001	457	43900	16480	7057	67894
2006	511	45602	15929	7840	69882

TOWARDS A CONCLUSION

In the 17th and 18th century, Demography was called "Political Arithmetick". This is no more apparent than when one discusses labour markets, as we have here. Our brief analysis leads to two general conclusions:

Firstly, in terms of training and recruitment of the highly skilled, we are entering a turbulent zone, where demographic-educational downdrafts are making for instability in the sources of energy which must drive the market. There may in fact be insufficient power to prevent significant loss of thrust, and thus of our relative position. This requires urgent but considered study.

Secondly, the policy analyst is frustrated by the severe lack of serious data for discourses on the issues around which such reviews might be built. Unfortunately, some analyses which may have been compelling in policy terms, such as the 1987 Treasury Report to the incoming government (NZ Treasury, 1987. see esp. Vol 1., 187, 191) drew prescriptive conclusions from a base of poorly analysed data. As a result, we may have lost a considerable amount of time we can ill afford if we are to achieve a well balanced highly skilled labour market, which also permits us the flexibility to expand and develop our economy.

There seems to be a general consensus that to survive and develop New Zealand must improve its skills. The highly skilled labour market and its training requirements are thus deserving of far more serious attention than they appear to have received to date. Within the time available and with limited resources we have attempted to outline some of the key factors affecting recruitment for one of this market's segments. We have not, however, been able to provide definitive answers to any of the points we have raised. Perhaps this seminar can provide a means by which the relevant skills and interests can be harnessed to undertake such an urgent task.

Certainly this is the time for proactive policy, not just at the tertiary level, but also at the secondary level (see Poole and Davies 1987, p.100) and in terms of the links between education, training and the workplace.

REFERENCES

Bathgate, M. & Pole, N., 1990, "A Preliminary Examination of University Enrolment Trends", Research & Statistics Division Bulletin, No. 2, November, Wellington, Ministry of Education.

Cabinet Committee on Training and Employment, 1987, Further Education and Training: Who Should Pay? Wellington, Govt Printer).

Davies, Lisa & Nicholls, K., 1993, Te Maori i Roto nga Mahi Whakaakoranga, Wellington, Research & Statistics Division, Ministry of Education.

Ministry of Education, various dates, Education at a Glance, Wellington.

New Zealand Treasury,1987, Government Management: Briefing to the Incoming Government, 2 vols. Wellington.

Pool, Ian, & Davies, Lisa, 1987. New Zealand Universities Until 2007: Demographic Structures and Changes, Hamilton NZVCC.

Shyrock , Henry S. & Siegel, Jacob S., 1976. The Methods and Materials of Demography, New York, Academic Press, p. 443.

Sturrock, F., 1993, the Status of Girls and Women in New Zealand Education and Training, Wellington, Research & Statistics Division, Ministry of Education.

Thurow, Lester, 1993, "How Reagan Forgot About Tomorrow" Guardian Weekly August 22.

United States, 1990, Statistical Abstract, Washington D.C.

Keynote Presentation: **"Educating Highly Skilled Labour: Demographic Aspects of the Contribution of the Universities"**
Ian Pool and Lisa Davies, Population Studies Centre,
University of Waikato.

Questions/Discussion

Key Issues

Student Allowances
In response to a question about the impact of the near elimination of student allowances on the retention rates of students in tertiary institutions, the presenters made the following comments:

This is of grave concern. Students do seem to have found it easier to pay fees than they do to survive financially during the year; and

Students are under pressure. They have to take jobs to survive; their study suffers as a result of overwork and stress. Repeating courses is not an option for many students as the costs involved are too great.

Other issues raised in the general discussion were:

"User-pays" Education
The shift to "user-pays" tertiary education has caught many unaware. It was "dumped" on students and their families with too little warning.

Stress, caused by financial pressure, does affect student grades.

New Zealand families are unusual among OECD countries as they tend to consist of several children close together in age. Many families are now in the position of having to choose which of their children will go on to tertiary education.

This has serious implications for Maori families, in particular.

Tertiary Fees
Tertiary fees do not appear to have caused a reduction in internal enrolments. External enrolments have, however, declined.

Because of the lack of data available on retention rates within universities, it is difficult to determine the impact of fees on enrolments.

Participants were critical of the lack of both data and data analysis in relation to students, staff and statistics.

Expansion of the Tertiary Sector
Although the tertiary education sector has expanded significantly in the last two years, there is still the capacity to increase participation rates in the sector particularly at the postgraduate level.

Any further increase in student numbers would need to be met by an increase in staff numbers.

Polytechnic degree courses
The increase in polytechnic degree courses could have an effect on university enrolments.

Postgraduate enrolments
Compared with other OECD countries New Zealand has a low level of participation at post-graduate level. Perhaps improved access to part-time postgraduate study could help improve this situation.

Ministry of Education figures indicate that postgraduate enrolments have increased considerably this year, although the breakdown of the figures has not yet been completed.

Women's participation
Women's participation has improved although there is concern that this may not continue. Families, faced with the increasing financial burden of education, will have to make choices about which of their children receive tertiary education.

Anecdotal evidence suggests that families will consider it wiser to invest in the education of male children than in the education of female children.

COMMENTS ON "EDUCATING HIGHLY SKILLED LABOUR: DEMOGRAPHIC ASPECTS OF THE CONTRIBUTION OF UNIVERSITIES"

Steve Marshall, New Zealand Employers' Federation

Overview

I found the Pool-Davies paper both useful and interesting even if a little pessimistic and depressing. Although acknowledging the factual base of historical analysis and the domestic demographic basis of projections, I do not necessarily share the conclusions reached.

This is largely because of my somewhat different view of future trends for New Zealand. My prognosis questions the assumptions leading to the projected outcomes and I am concerned that we cannot really come to grips with the issue without at least considering the impact of re-skilling demands.

I am conscious that this is a university orientated seminar, however I believe that in order to view university needs and directions we must consider the whole of the tertiary education sector.

But firstly two general considerations and underlying assumptions:

- No one could argue with the Cabinet committee's identified relationship between economic performance and attitudes to education and training. This, however, does not necessarily follow through to an assumption that the traditional university system is necessarily the prime focus for its delivery.

- There is an implication in the paper that total funding has been cut and that there has been a fundamental transfer from a public to a private good approach with a corresponding shift in funding responsibility. This bias is accentuated by a major jump in logic in referring to Thurow's comment on 16 years' investment in education.

We need to remind ourselves that the state subsidises the tuition fee of certain students by 95% and others by 75% (1994 figures). In other words, on paper some students are being required to accept 5% of the funding responsibility of their tuition fees, others 25% On

international comparisons this level is fair and reasonable. On top of these state subsidies are of course are targeted student allowances and subsidised loans.

As I understand it, the decision to charge a tuition fee was taken by the previous administration on two counts: firstly on a matter of principle relating to shared public and private benefit, and secondly because of the economic realities of fiscal pressures. I accept that it can be debated as to which was actually the prime driving force. Quite likely it was the latter and we should not be surprised at that. In terms of the former reason, I suggest to you that 5% - or even 25% -is a weighting which only starts to reflect the proportion of private good accruing to the individual from tertiary education.

Some may not like the shared responsibility approach but so long as there is an expectation of almost universal continuing post school formal learning, I suggest that we have no option but to accept it. This means looking at new and innovative ways of doing things.

Trends and Projections

Whilst accepting the validity of the use of past and present facts and figures to identify trends I believe we have to recognise the major structural changes taking place in the world and at least consider their implications on our education and business systems.

As protectionism is removed and geographic boundaries lose their significance with the inevitable increase in competition, the growth in consumerism and the impact of information technology, our horizons as educators and business people will expand.

The paper stresses domestic needs and no one would disagree with the objective of improving the lot of New Zealand and New Zealanders. I suggest, however, that this will need to be achieved with an acceptance that the New Zealand economy is now well and truly integrated into the world economy. This means that New Zealand employees, and particularly high skilled New Zealanders, are part of a world labour market.

We should not resist this trend as to do so would simply slow up our own development. Our previous insularity could in itself be the cause of some of the identified problems.

In considering a world labour market we should not look at wages alone. People with required skills are attracted to New Zealand for a variety of reasons beyond the job. Our environment, culture, etc all play a part and although I don't accept that when we have adjusted to the world market concept we will have differential rates for locals and ex-pats, I similarly don't see us having to artificially increase income levels generally to attract or retain staff. Local factors will have a balancing effect.

As the competitive world economy takes hold, new demands are being made; production runs are becoming shorter, the complete product range or services delivered by organisations will change regularly and rapidly as they innovate to meet or create new consumer demands, performance to international product quality standards will be the norm and the product input costs will be so tight as to have little margin for competitive advantage. That advantage will therefore depend largely on the positioning of the company in terms of its products or services, i.e meeting consumer demands, and the skills, motivation, responsiveness and efficiency of its staff.

Education and training is now and will increasingly take on an importance as a critical investment for business, not just in respect of new entrants but for a large proportion of the workforce of 2000AD who are of course already employed.

New partnerships between education and business will form as one of the mechanisms to meet this demand. What the writers see as possible disadvantages - the accelerated training approach and use of part-time study - will likely become an advantage.

Post-school choices

A shrinking youth labour market is one of several contributing factors which has resulted in higher senior secondary retention rates but we should not be surprised that the progression rate to universities has not kept pace. Surely this flags a need for us to review our attitude towards post-school education. There has been a tendency to assume or even encourage all who remain at school for a 7th form year to target university. University was the elite post-school target sought by all who stayed on for a fifth year of secondary education. Now increasing retention rates in the senior secondary school have forced an expansion in the curriculum offered to the greater numbers of less "academically" oriented students. This move is being accelerated with the ability of schools to offer levels 1 - 3 qualification

framework units which can be credited towards a National Certificate. This fact is being recognised by polytechnics, private training establishments, Industry Training Organisations and individual enterprises, which are starting to work with schools to design and develop appropriate curricula.

An identification of parallel progression rates for polytechnics would have been interesting. Similarly it would be interesting to identify what new core subjects secondary school students are enroling in.

I suggest that the new competitive economy will continue to limit the number of unskilled jobs young people can move to straight from school. Maturity, the possession of skills and/or work experience - via, in most cases, the proxy of a recognised qualification - will become increasingly important. This trend will likely increase retention levels both in school and post-school education notwithstanding some demographic reduction in numbers.

Consumer-driven education?

The tertiary sector is in the business of delivering a service. I have already referred to the private-public good argument and I reconfirm my belief that the reality is one of shared responsibility. In recognising inevitable economic developments the education sector must further recognise its responsibility to be consumer responsive. Failure to so do will simply result in other providers stepping in and providing the sought after service.

The consumers I refer to are and will be on an increasing basis both students and business/industry/commerce in the private and public sectors. I believe programmes of study and in many cases their delivery will be determined more and more by those consumers. Universities' - and other providers' - responsibility will be to develop close relationships with their markets in order to identify with them their education and training needs.

In light of the changing nature of society I suggest that a much greater variation of programmes of study will be called for ranging from current degree and advanced programmes to short intensive single segment programmes - with increasing calls for the latter.

Global labour market

It is probably important to differentiate between skills importation and immigration. I have already mentioned the likely development of a more mobile labour force in a world market. If we have identified short term skill shortages they will likely be filled through the operation of this market, i.e. the importation of skills. At the same time it is likely that we will experience accelerated immigration to build our population base. This will add a further dimension to both mature and youth education and training demands.

Staffing

I doubt that university teaching staff will be exempt from the almost inevitable demand for mobility and continuous re-orientation already underway in the productive and service sectors. But rather than being a threat to professionalism and job security, I would see this as an exciting positive opportunity and challenge for those concerned.

As business education partnerships develop and as businesses identify their need to work smarter, I believe it inevitable that we will see a dramatic increase in staff exchanges or secondments and greater mobility between engagements in the education and business sectors. I also see an increase across the board in co-operative education, ie. structured programmes in which relevant and productive work is an integral part of a student's regular academic programme and an essential component of final assessment.

Finally I cannot refrain from commenting on the thesis developed around the "embittered" university age cohort. The concept is presented in a somewhat over-dramatic and emotive way which I believe completely overstates the situation. I suggest that the young people of today are better informed and more realistic than given credit for by the writers. The student of today, I believe, recognises and generally accepts the harsh but inevitable realities of life in a new world order.

Sadly the commentary appears to reflect on an embittered teaching profession resistant to change, which does not bode well for universities in their efforts to meet new challenges.

The Universities & The Labour Market

Response by the New Zealand Council of Trade Unions to the preliminary papers distributed to the AUSNZ/NZCER Seminar, 8 October 1993

The CTU does not wish to take up particular points of analysis and interpretation in the background paper. It is strongly supportive of the general thrust of maintaining universal access to higher education and of the philosophical support for the public good nature of education.

These comments are meant to add some perspectives to the issues raised, and to warn that universities cannot ignore the unfinished business of those who would deny their contribution to the wider national well being.

The broader context of the CTU response

The CTU has, for some time now, been arguing that government policies, particularly as they effect the labour market, need to focus on securing the longer term competitive advantage of New Zealand enterprises through high quality/ high skill/ high value production, as opposed to competing on the basis of low labour cost.

The problem though, is that our post school education and training policy is essential voluntarist and unco-ordinated. The CTU does not believe that a voluntarist model of education will in fact deliver the upgrading of the skills base necessary to service a quality economy.

Even where retention rates at school and university intake levels are up, they are often accompanied by a deterioration in other forms of skills development.

At the end of the 1993 financial year, there were 11,940 active apprenticeships - a mere 45 percent of the 26,256 apprenticeships active five years ago. With new apprenticeships, the numbers are worse - 2,843 in 1992/93 compared to 7,546 in 1987/88. Add to that the decline in public service cadetships and reports of declines in other traineeships in the finance and similar industries, and the pattern is not a simple one of growth, but a complex one of displacement.

The universities in the skills development framework.

Not only should we be looking at "high skills" future, but we should also be looking at a future in which the impact of technological change will mean that the normal expectation would be for a worker to have more than one career. The universities could see this as creating an opportunity for second chance education and routine retraining - and generating a new "core" student population of mature retrainees.

The problem is that it is unlikely that "full" retraining will ever be affordable. A cost effective retraining system upgrades and refocusses skills, and that in turn implies that there needs to be much more emphasis on the core generic skills that can be "fine tuned" for occupation specific use. These include basic numeracy and literacy, communications skills, inter-personal skills and problem solving.

This may clash with the disciplinary specialisation of the traditional university course, an with the short term vocational relevance that the EFTS funding regime is steering universities towards.

Universities and the strategic requirements of the composition of skills

The government's strategic "vision" *Path to 2010* argues that "we need to take steps to increase the number of New Zealanders graduating with science and engineering masters and doctoral degrees". However, for universities with differential fee structures, courses leading up to these degrees are the most expensive. This is an area where some negotiation will be needed to reconcile government expectation with university practice.

Universities and skills backlog.

There has been a tremendous displacement of labour in the course of economic restructuring. Large numbers of displaced workers have no certificated nor recognised skills, but have accumulated a large amount of knowledge through "prior learning".

Incorporating this flow into the university mainstream will pose particular problems. Access to undergraduate study via "mature student" status is the easy part. Changing teaching systems to build on the prior learning to make universities "mature user friendly' to attract and retain the displaced worker is the hard part.

It should also put pressure on the government to change the study right scheme, which at present discriminates against the mature "first chance" learner.

Universities and the qualifications framework.

This is a sensitive area that impinges on academic freedom and the autonomy of the universities. However, if there is a shift to retraining, to upgrading the skills stock and not only to train school leavers, and so on, then the universities must

recognise the need for portability of skills, not only between universities but across training institutions.

Portability is enhanced within a national qualifications framework, which ideally should also, where practical, lead to the recognition of "prior learning", and the CTU is a strong supporter of the development of a comprehensive framework.

Universities and the funding of skills acquisition.

As the background papers note, there are huge challenges facing universities as they try and follow a long term strategic development path in an environment that is hostile to planning and dominated by short term funding commitments.

The task is made more difficult by the fact that the ideological battle to regard education as a private good is far from over.

Roger Kerr, the Executive Director of the Business Roundtable put it this way at an AIC Conference in July last year

> *"Government assistance at the tertiary level may, in my view, be justified on the ground that commercial capital markets are not sufficiently geared to lending against expected future student income streams. As I point out later, while this may justify a government -supported loan scheme, it doesn't necessarily justify significant government subsidisation"*

The labour market agenda for the universities is complicated enough - the unfinished business of the Business Roundtable is to make you confront it without any government funds!

ADMSW/ALISCER
13 OCTOBER 1993

THE LABOUR MARKET AND UNIVERSITIES

NZCER & AUSNZ Seminar

Wellington
14 October 1993

A response to Ian Pool and Lisa Davies' paper

by
Dr Anne Meade
Director, NZCER

Mihi

I bring to this task two perspectives: that of a woman; and that of Director of a national research institution - NZCER - which has strong connections to academia and which employs staff who have advanced knowledge and skills in educational research. I should also explain that I was, until recently, a university teacher and researcher.

I have two main comments to make about Ian Pool and Lisa Davies' paper "Educating Highly Skilled Labour: Demographic Aspects of the Contribution of the Universities" (1993).

Enrolments

My first main comment is that the authors' concentration on what they call 'core age' students (those aged 18 - 24 years) means that important data and information are not included. Such information is significant if the State is to develop policies and provisions for up-skilling as well as re-skilling New Zealanders. I say this in the knowledge that core age students are likely to continue to be the majority of students, especially of full-time students. (Ministry of Education statistics show that 13.4% of people in that age group [spanning 7 years] are currently participating in university studies, whereas only 6.7% of 25 to 34 year olds are attending university).

A significant group of non-core students is mature women. Mature women's educational qualifications are generally lower than those of young women who are currently leaving secondary school. Moreover, surveys conducted by the Society for Research on Women in New Zealand in the 1970s and 1980s (eg, SROW, 1980) indicate that women take on jobs below their skill level after having children. Second-chance education at the tertiary level is important for their re-skilling, but what incentives are there to enrol?

One of the by-products of this centennial year of women's suffrage in New Zealand is the publication of data about women in education and

I would like to draw attention to another factor which could emerge in the near future. Part of the initiatives associated with the National Qualifications Framework includes policies on the recognition of prior learning. (In passing, I want to say that NZCER has been playing a significant role in developing New Zealand's understanding of ways of implementing these policies.) I believe that if the universities were to extend their provisions for giving credit for prior learning to **recognising** prior learning, this would act as an influential incentive for mature students and, in particular, women to enter at an advanced level. However, this policy could exacerbate the projected decline in enrolments of the core 18 - 24 year old group (Pool and Davies, 1993). In other words, if universities were to extend their recognition of prior learning, it could have a two-fold impact. It could increase the participation rates in advanced courses of non-core, mature students, but encourage potential core students to take alternative routes to gain a first degree or its equivalent. These routes are likely to be slower than full-time courses, and will not serve to accelerate training. I guess, the Study Right policies could counter-balance this tendency.

Elsewhere I have commented that mass education in universities could decline[1], and the focus of universities may shift to advanced studies. More core age students may take alternative routes now that other tertiary institutions can confer degrees. The signs are there that if the university sector wants to maintain its share of the student population, it could soon find itself having to do more to attract students. As well, Pool and Davies warn that, for demographic reasons, there will be a smaller pool at core ages to recruit from.

Staffing and Research Capacity

My second main comment picks up on the brief statement made by Pool and Davies about New Zealand's lower participation rates in courses of advanced study at masters level and higher. Sturrock (1993) has indicated that women are even less likely to graduate from postgraduate courses.

In order to fulfil its statutory functions of fostering educational research and providing information, advice and resources, NZCER needs to employ staff who are experts in the field of education. Kogan and Moses (1992, p.10) describe how faculty members become "experts through advanced study and application, and they stay experts by continuous engagement with their field." They note that in some countries such as Australia, academics also tend to have practical experience prior to their appointment. All these processes also apply to the education and training of educational researchers on the staff of NZCER.

Like the universities, NZCER has had an upward shift in age of its staff in the last decade. If and when funds allow me to recruit more staff to replace those who have recently retired, I will be looking at the post-graduate student population. However, I have to say I feel worried about the lack of growth in numbers of students

---

[1]. When commenting on Professor Hugh Lauder's paper "Contemporary Dilemmas of a University Education", at a symposium on *The University, Ethics and Society*, VUW, June 1993.

training (Sturrock, 1993). Included are data relating to mature women. I quote,

> "In universities, women ... over 30 years of age outnumber men.
>
> "Although women have recently begun to out-number men at university, they tend to be older than their male counterparts, more likely to be studying part time or externally, and to be concentrated in traditionally female fields of study. They are less likely to enrol in postgraduate programmes. ...
>
> "Overall, slightly more women are enrolled in university programmes than men, but this does not follow through into graduation ceremonies. Gender differences in qualifications are most pronounced in postgraduate courses," (Ibid., p.91).

Two observations follow from this quote: first, Study Right policies do not fit this pattern of women's later and part time participation in universities and, therefore, the lack of support is likely to stall their enrolment or further slow their graduation. Second, if New Zealand wants to accelerate adults' skills acquisition, then women's participation and achievement in university begs further study to bring about policy changes to improve the outcomes for over half the population. Such study would be important not only for the university system but also for the economic performance of Aotearoa, New Zealand.

If New Zealand is to meet the Education 2000 EFTS targets and the "potential for growth in the number of core students [has now been] exploited," (Pool & Davies, 1993, p.10), then the participation rates for non-core groups must be improved. The final table provided in NZUSA's *Education Statistics* (1993) indicates that the number of tertiary students needed to meet the Education 2000 target should be 245,465 compared with 165,085 in 1991. This will require a tertiary participation rate of 38% (26% in 1993).

As the comparatively greater use of extra-mural courses and part-time study at tertiary level are characteristics of New Zealand tertiary education, we need to examine the reasons for these patterns in order to increase our participation rates. Are these types of participation a matter of free or forced choice? In 1960, part-time and extramural students were in the majority (just), so clearly there is a tradition of these types of attendance. In 1991 they still comprised 38% of university student numbers (Ministry of Education, 1993). Why does New Zealand continue to have such a high proportion of part-time students? Is there a relationship between this form of participation and part-time employment? (In the year ended 31 March 1992, part-time work accounted for more than a fifth of all employment. Women make up 73% of the part-time workforce, and 36% of all employed women work part time.)

The authors of the keynote paper comment that factors such as employment opportunities as well as fees are more likely to influence enrolment decisions and account for fluctuations in non core students' participation than core students.

graduating with higher degrees in New Zealand.

In past years, there were far greater incentives in the scholarship system for students studying mathematics and some physical sciences to continue than there were for students in humanities faculties. In the 1990s, there is no incentive in the Study Right policies for students to continue past their first degree. In addition, with the restructuring of research, science and technology and the introduction of contestability, I believe there has been a loss in incentives for scientists, including social scientists such as educational researchers, to personally invest in advanced scientific education and training when their careers have become less secure. PSA (1993, p.4) recently asked,

> "... [W]hat effect [does] the science funding system [have] in terms of national development aims [in reference to enhancing the skills base]. For it is apparent that, despite the Foundation's mandate to develop scientific skills and expertise, and despite the evident concern with this issue shown in the Foundation's research strategies, there are grave concerns about the impact of the competitive funding system on New Zealand's ability to develop and retain 'trained and motivated minds'.
>
> " ... Therefore it now matters greatly if either the reality or the perception of a career in public good science is one of insecurity and personal vulnerability."

The impact of these two quite distinct policies is likely to be negative on students progressing on to advanced studies courses. I feel gloomy about the future staffing situation for the universities, and for NZCER, and other research institutions as well.

Conclusion

Pool and Davies' paper and the issues it raises and the issues it can only suggest because of lack of data has led me to the conclusion that it is time to conduct a large-scale study of New Zealand universities. I would like to suggest that NZCER, an independent research organisation, presents as an ideal base for such a study. The support of AUSNZ and the New Zealand Vice-Chancellors' Committee would be important. The first question is to ask if others agree that there is a need, and the second is to identify possible sources of funding. **It is my belief that we may find the answers to these questions at this seminar.**

Kia ora hui hui mai tatou.

References

Pool, Ian & Davies, Lisa (1993) "Educating Highly Skilled Labour: Demographic Aspects of the Contribution of the Universities," Draft paper to be presented at the NZCER and AUSNZ Seminar: The Labour Market and the Universities, Wellington, NZCER, 14 October 1993.

Kogan, M. & Moses, Ingrid (1992) "Staffing of Higher Education: An Overview of Issues," A paper written for an OECD workshop: OECD Programme on Institutional Management in Higher Education, May 1992.

NZUSA (1993) *Education Statistics*. Wellington: NZ University Students Association (Inc.)

PSA (1993) "Contestability and its Consequences: Science Funding and the Development of the National Research Capacity," A paper presented at the Science Funding Seminar, Wellington, July 1993.

Society for Research on Women in New Zealand (1980) *Women and Money*. Wellington: Society for Research on Women.

Sturrock, Fiona (1993) *The Status of Girls and Women in New Zealand Education and Training*. Wellington: Ministry of Education.

Respondents: **Steve Marshall, NZ Employers Federation**
Stephanie Doyle, NZ Council of Trade Unions
Anne Meade, NZ Council for Educational Research

Questions/Discussion

Key Issues

Skills of graduates
When asked what an employer sought from graduates, Steve Marshall made the following comments:

From an employer's perspective, university education should train people for the global employment market. A degree signals to an employer that a potential employee has self- discipline, research skills, problem-solving skills, and communication skills.

The particular subject that a degree is obtained in does not necessarily matter.

University education provides young people with opportunities and hope. Some people overestimate the "embittered" attitude of the country's youth. Young people are realistic about the "harsh realities of life" but they also realise that there are still plenty of opportunities for those who try.

Embittered youth
One respondent challenged Steve Marshall's assertion that young people are optimistic about the opportunities available to them. She said that the "harsh realities of life" mean that many young people do feel embittered and cheated as they cannot afford to take up education and training opportunities.

These bitter feelings are exacerbated by young people and their families being able to remember a time when tertiary education was virtually free and when anyone who wanted to undertake tertiary education would receive a reasonable living allowance.

Broad-based degrees
If employers want to recruit people with broad-based skills, should university education in New Zealand move towards the American style liberal arts degree?

Employers do consider a broad knowledge base desirable in employees. For specific skills, employers could hire specialist consultants.

Skill shortage
Employers have not experienced a significant skill shortage in New Zealand. Immigration policies have meant that any skill shortage is able to be met through overseas recruitment.

Tenure
Universities should abandon the tenure system so institutions do not have "almost permanent" staff members. Departments should employ a "core staff" for core curriculum teaching. Outside experts should be brought in on a short-term basis to teach specific subjects.

Universities should adapt their management and work styles to meet the challenges of the new world order.

University staff feel bitter about rapid change in their employment conditions. Staff need training to help them adapt to the new user-pays, full-cost-recovery environment.
Training is a management issue. University administrations should be addressing this problem.

Student Loans
New Zealand employers may begin to offer remuneration packages to potential employees that include "buying" student loan debts.

Research Implications
There is often a conflict between the research needs of business and industry and the research priorities of universities.

Universities may be the appropriate institutions to deliver advanced level teaching but perhaps there should also be research-only institutions?

"Seamless" education
Education, especially at the senior secondary school level, needs to be portable. Perhaps the Quebec model of a "tertiary education community" could be used as an example. Under such a model, university education would be aimed at the later part of under-graduate programmes and at postgraduate programmes.

Waikato University is moving towards such a model. Some courses at Waikato may be started at an out-of-town polytechnic and completed at the University.

There should be greater articulation between polytechnics and universities and between polytechnics and high schools. To an extent this is happening. Seamless education already exists.

Part-time study
Are employers concerned by how long a person takes to complete a degree? Many students, particularly women, study part-time or sporadically over several years.

Why do many people study part-time? It seems to stem from the old fashioned idea that only the elite attend university. Other people "do a bit of training" from time-to-time during their working life.

The apprenticeship system was also a way in which people obtained training.

Detailed statistical information on full-time/part-time study and labour force participation is not kept. Perhaps the Household Labour Force survey could be adapted to include a section on employment, education and training?

Massification
As the demand for "mass education" already exists, individual institutions will have no choice but to provide the type of education that people want.

Equal opportunity
Both Maori and women are over-represented in part-time and external enrolments. It is important to involve Maori, women and other under-represented groups in the development of education policy.

Maori business is prepared to invest in education as it appreciates the long-term returns of investment in education for Maori as individuals and as people .

In general, people are slow to change their attitudes and prejudices. Gender barriers and stereotypes in education and society at large still exist. Until attitudes change society will not successfully come to terms with equity issues and problems.

Seminar: The Labour Market and the Universities - 14 October 1993

A Response to the Keynote Paper: "Educating Highly Skilled Labour: Demographic Aspects of the Contribution of the Universities"

In response to the keynote paper presented by Professor Ian Pool and Lisa Davies for the NZCER and AUSNZ seminar the NZVCC Secretariat wish to present the results of some preliminary projection work undertaken recently. These results are less conservative in their assessment of participation trends than those in the AUS keynote paper.

The keynote paper argues that a plateauing of participation in university education of the core student cohort (18-25) will occur from 1993 onwards and that this participation change will be augmented by a reduction in the total level of the core university age cohort (18-24yrs) up until the year 2000. The paper employed an historical trajectory for university participation which was one of slow growth, then a spurt to the early 1990s and then virtually no further acceleration. The justification for this last assumption was explained as largely qualitative - a perceived decline in the feeder role of secondary schools, due in part to an easing in unemployment. The AUS paper as a result concludes that there will be a decrease in university enrolment up until 2001.

What appears to be neglected in the AUS keynote paper is that the "youth deficit", referred to in the paper, has a corollary - a prime age surplus. The increase in the percentage of the population which is aged 30 years or over means that minor increases in participation for this cohort may in the future equate to large increases in enrolment in the university sector, a sector which is well equipped to serve the needs of those in mid career needing upskilling or retraining.

There was a suggestion in the keynote paper that linear models based on past enrolments could be misleading in the projections they produced. This was because it was argued that the historical increase in secondary retention is about to plateau. If, however, a no participation growth scenario is employed, significant growth in enrolments produced by prime age cohort change, still remains. (see model 3 attached)

Enrolment results, like that produced by model 3, appear in our opinion, to be too conservative. We believe that any potential easing in unemployment is unlikley to impact upon the decision to undertake university education. This is because any potential growth in jobs numbers would be more likely to occur in areas of the labour market which require a tertiary education for entry.

It is also worth noting that a recent student intentions survey undertaken in New Zealand by the Heylen Research Centre suggests that in 1991 and 1992 significant numbers of those who registered themselves as very likely to go to university were not able to attend, and were consequently displaced into the polytechnic sector. It appears that university education is a first choice for many school leavers, and in this sense university enrolment may be less prone to any easing in school leaver unemployment.

While a direct relationship between workforce participation and enrolment is found by the June 1993 Quarterly Economic Review for the polytechnic sector[1], the change in participation for the university sector does not show such a direct correlation to workforce participation trends.

[1] This publication suggests that the 3% decrease in workforce participation from 1991 is almost directly matched by an increase in numbers of people undertaking study in the polytechnic sector

It appears that the emergence of the recent trends in increased school leaver university participation could be more a result of marked changes in the attitudes and educational aspirations of school students, than workforce participation trends.

Such marked changes have been experienced in Australia, (see "Recent Trends and Current Issues in Australian Higher Education", DEET 1993). There is no reason to believe that these changes are not also occurring in New Zealand, and will not continue to occur in the future.

Despite all these suggestions, it is quite plausible that trends in school leaver university participation may indeed taper-off, as suggested by the AUS keynote paper. The danger is, however, that this occurrence will be the result of conservative government EFTS allocation - influenced by conservative assessments of future student demand.

In light of this issue it was considered useful to present a more optimistic appraisal of the future of New Zealand university enrolment. If one accepts the assumption that trends in participation are not likely to taper-off significantly, then the attached may be worth considering.

University Enrolment Trends and Projections to 2000

Background

On the meeting of Friday 11 June 1993 the Committee resolved that a background paper be developed on the projected level of growth in tertiary and university enrolments in the next 3-5 years taking into account age cohorts in the schools, trends in participation rates, developments in the economy and government policy.

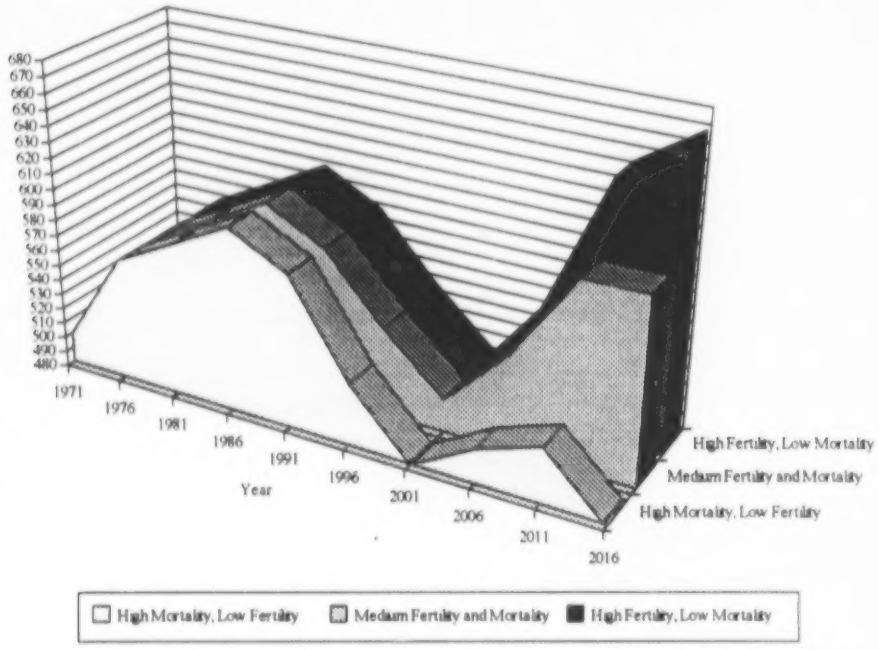
The following presents a precursory appraisal of these issues:

Demographic Trends

- *decrease in university entrance cohorts*

  Updated projections indicate that the total 15-24 year old cohort in New Zealand will decrease on average by 10% over the next 7 years with a major increase in the cohort occurring in the following decades.[1]

Projected Changes in the 15 to 24 year old cohort of the New Zealand Population



Source: Demographic Trends 1992 Table 8.3 pp. 125-6

- *increased retention of secondary school pupils*

  Reductions in the school leaver cohorts may however be outweighed by increased retention of secondary school leavers. High participation rates at university and other institutions of higher education depend primarily on recruitment from secondary school. (Thomson, 1983, p 65) While education participation rates have

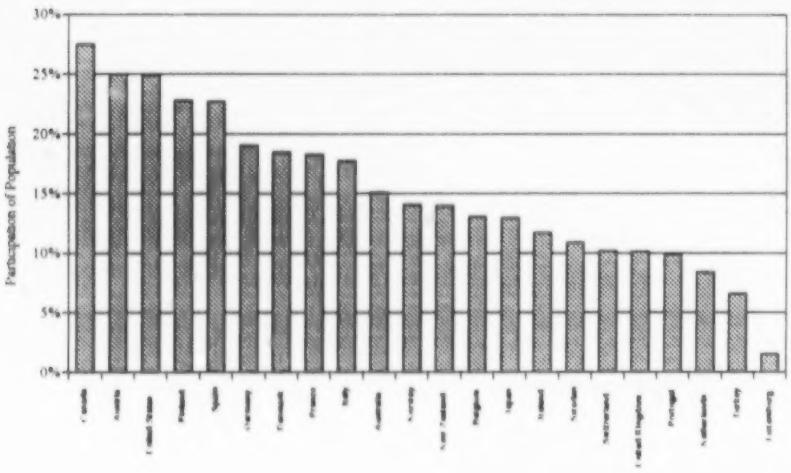
[1] D J Griffin (1987) has previously detailed a drastic reduction in the 15-24 yr cohort continuing after 2001 in: "The Supply of Technological Skills to a Changing Economy", Paper presented to IPENZ Conference Feb 1987, Massey University, New Zealand. This data is now outdated. Current demographic trends show an upturn in this cohort after 2001.

increased significantly over the last five years they are still at a low level on an international basis.

Indeed, Crocombe, Enright and Porter, suggest that one of the failings of the New Zealand Economy contributing to a lacking in its competitive advantage is its internationally low participation in education. Crocombe (et al) suggest that on average young New Zealander's spend far less time in formal education than is common in most industrialised nations. Throughout the 1980s and early 1990s school retention rates are lower than those of many other nations in the OECD. According to Crocombe (et al) these internationally low retention rates are reflected in a current workforce, of which 38% have no recognised educational qualifications.

The potential for continued growth in senior secondary school and tertiary participation is evident when New Zealand current participation rates are compared with other OECD nations.

Higher Education Participation Rates in OECD Countries, 1988



Source: Education at a Glance - OECD Indicators, 1992, p 81.

Note: that, while this OECD ranking is generally representative, the New Zealand definition of higher education includes vocational training and is thus inflated relative to other OECD countries, especially Japan, the UK and Sweden.

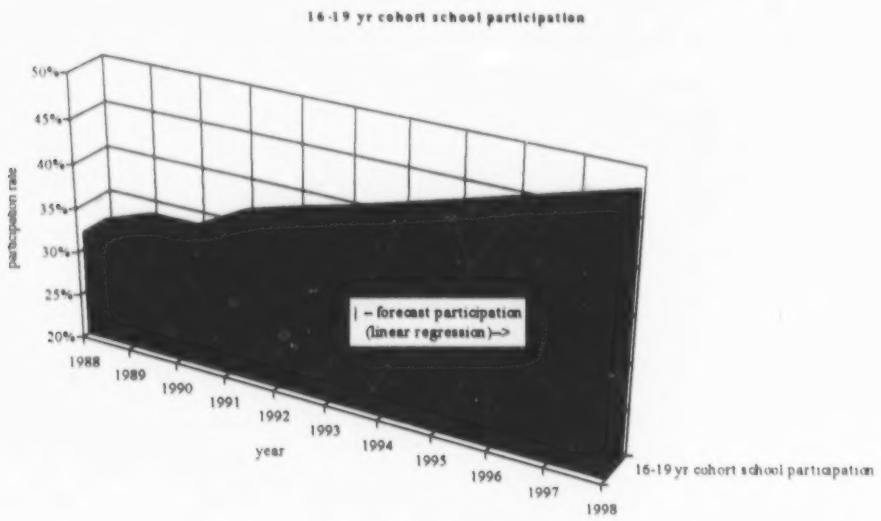
When New Zealand's international position in terms of educational participation is analysed, the continuance of growth in secondary school participation seems likely. Internationally low school retention rates would suggest that an impetus for growth in school retention rates is needed, and indeed, current government initiatives and labour market conditions should promote increased school student retention in the near future.[2]

If the previous growth in high school participation in the senior years continues 48% of 16-19 year cohort will be enrolled at high school in 1998, see below. However, such as continuation of growth may overestimate the present trends. recent 1993 data suggests a fall off in the growth in total high school retention, associated with an easing of labour market conditions. Nevertheless trends in retention rates will

[2] Government initiatives in reforming senior secondary school curriculum development as well as and the prospect of high unemployment amongst school leavers without senior secondary school qualifications, should induce higher retention rates in the medium term. The unemployment level amongst school leavers will remain high over the next few years because:

- predominantly low skilled and underqualified non tertiary bound school leavers will continue to be unlikely to enter the workforce as the New Zealand labour market will continue to demand ever higher levels of education and technical expertise; and
- more and more people are in fact getting the extra education being demanded by employers. Similar effects as those experienced in Australia recently also may create their own demand. Australia has recently experienced marked changes in the attitudes and educational aspirations of school students. Young people have been staying on at school because of a heightened community perception of the benefits of education such as the improved skills and qualifications and better job prospects it offers.

continue to be positive, and the projected fall off in growth in retention may not effect the university sector. The polytechnic sector would be expected to bear the brunt of retention rate changes induced by enhanced or reduced school leaver employment prospects.[3]



Source: historical retention rate statistics supplied by the Ministry of Education
- trend analysis undertaken by author -

- *aging population and the increased involvement of mature students*

Despite slow overall growth, New Zealand's population age structure will undergo profound changes, leading to significant population ageing over the next 40 Years. Given the scenario of a two-child family and limited migration gain the median age of the population will rise steadily from 31.3 years in 1991 to 39.1 years in 2031.[4]

The aging of the New Zealand population and the prospect of continual growth in the participation of the growing mature age cohorts in New Zealand, may dramatically change enrolment patterns and the age make up of the university population in the next 10 years. Prime age adult cohorts may increasingly participate in university education through the retraining and up-skilling offered by postgraduate diplomas, and specialised extramural programmes. Assuming no change in mature student participation rates, mature student enrolments (25+) as a proportion of total university enrolments will increase from 39.3% in 1992 to 50% by the year 2000.

[3]In Australia student surveys suggest that students generally regard TAFEs (NZ polytechnic equivalents) predominantly as a places too quickly increase job opportunities whereas universities are regarded as delaying quick entry into the workforce. (DEET 1993 - "Recent Trends and Current Issues in Australian Higher Education" pp. 34). There is no reason to believe that this is not the case also in New Zealand. Hence there could be a greater nexus between the labour market and the polytechnic sector in comparison to the university sector. The fact that the BNZ June Quarterly Economic Review finds that the 3% decrease workforce participation from 1991 is almost directly matched by the increased number of people undertaking tertiary study in the polytechnic sector, also backs up this suggestion.

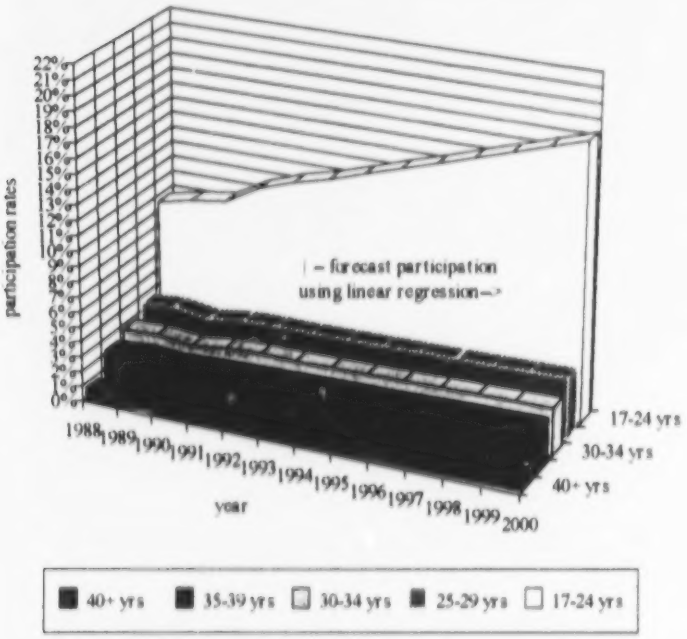
[4]Department of Statistics, "Demographic Trends 1992" see especially Part 8 National demographic projections, pp 121-128

University Participation Rate Projections

- *Some Preliminary Results*

An initial analysis based upon some simple regressions of historical universities participation data, (attached) produces the following projected growth rates in university participation by age cohort. Further work is required, but we expect these initial results to be vindicated when more sophisticated forecasting models are made available from the Ministry of Education later in 1993.

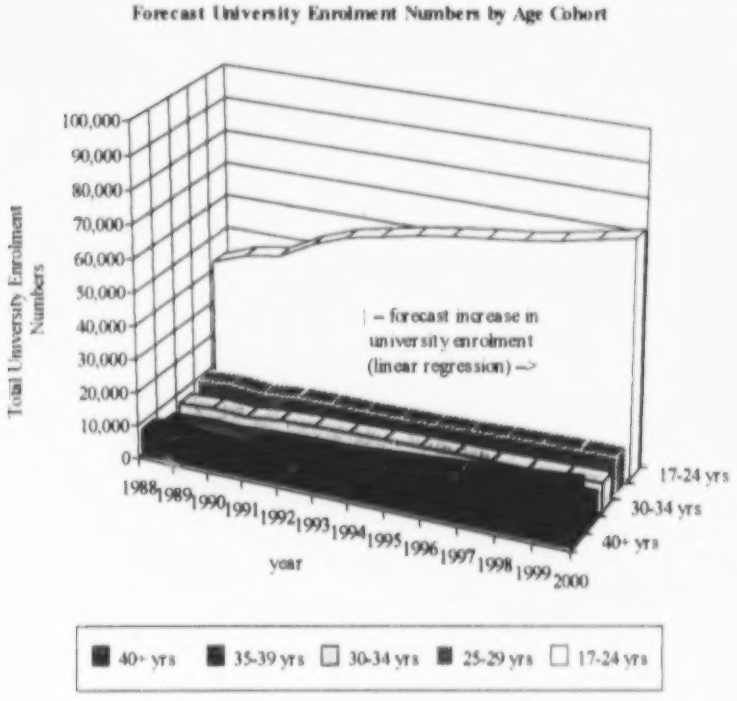
University Education Participation Rates of Age Cohorts



Source: historical university participation rate statistics supplied by the Ministry of Education
- trend analysis undertaken by author -

- *Forecast University Enrolment*

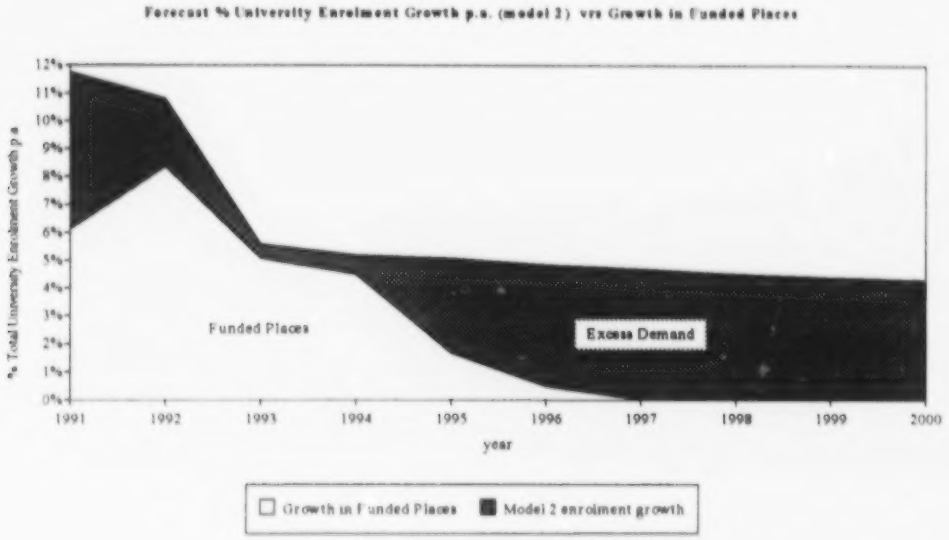
The projected growth in participation rates for all the cohorts above, significantly outweighs the projected decrease in the school leaver cohort for the 1993-2000 period, and results in a continual increase in projected total university enrolments between 1993 and the year 2000.



Source: historical university participation rate statistics supplied by the Ministry of Education - trend analysis undertaken by author -

- *Unmet Demand for Student Places in the University Sector*

The growth in the projected number of those wishing to enrol in the university sector, which is based upon demographic and participation trends, is not sufficiently provided for by future government commitments. When projected enrolment numbers are compared to cabinet approved levels of funded EFTS places the result is a high and expanding level of excess demand for student places.



Source: Cabinet Approved EFTS numbers from MoE Publication

Factors not Encompassed by Preliminary Participation Rate Modelling

Factors which might have a bearing on the future demand for tertiary education and participation rates are:

- *Developments in the Economy*

i. the forecast level of private contribution for tertiary education, and the price sensitivity of the demand for tertiary education.

ii. the projected private and social returns to tertiary education.

ii. projected labour market conditions and unemployment levels.

iv. the forecast recovery in the general state of the economy.

In order to develop an accurate and robust appraisal of the impacts of the above factors on projected student demand, the development of an econometric model would be required. An approach similar to the one employed recently (1993) by Chapman and Harding in Australia is recommended.

These Australian academics have used a dynamic micro-simulation model to project future returns to higher education in Australia. The data source is the HARDING lifetime micro-simulation model, which tracks 4,000 simulated Australians year by year from their birth to their death. Such a modelling procedure captures the effects upon the return to tertiary education of martial status, and number of children, (which affects paid labour force participation), long term unemployment, differential mortality. Such an approach would produce a comprehensive quantification of the projected future benefits of tertiary education for all types of tertiary student against the costs of that tertiary education. The results of such a model could be aggregated to produce a sophisticated forecast of student demand. A forecast based upon a

representative sample of individual tertiary education investment decisions, which would in turn be determined by the projected future state of the economy, labour market conditions and unemployment levels, and corresponding higher education investment criteria.

Such a model would augment the sophisticated demographic and participation rate based forecasts soon to be provided by the Ministry of Education and would provide some rational assessment of the future price sensitivity of demand for tertiary education.

- *Future Government Policy Issues*

  Irrespective of student demand, Cabinet decisions make explicit that in the future the provision for funded EFTS growth in tertiary education is meagre. This being the case, a significant level of unmet demand is being projected. However such a projection does not take into account the possible price impact of a continuation in the erosion of government funding, and the corresponding potential reduction in demand for tertiary education. The econometric model recommended above may however give an appraisal of these effects, and quantify the argument that price increases reduce equality of access and participation.

Participation Rate Analysis

[Model 1 Logistic Regression]

Table 1a Enrolment Change - Universities

Age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2
							Forecast Enrolments							
15				9	10	11	12	14	16	17	19	22	25	
16				17	12	9	6	5	4	3	2	1	1	
17	718	613	670	523	346	329	284	240	207	185	161	135	118	
18	7,857	8,833	8,878	9,132	9,120	9,488	9,399	9,761	9,956	10,305	11,144	11,634	11,808	12
19	8,606	9,583	10,246	11,684	11,967	12,680	13,477	13,846	14,913	15,778	16,938	19,001	20,574	21
20	7,804	8,634	9,256	10,756	11,961	12,518	13,325	14,242	14,707	15,932	16,950	18,302	20,649	22
21	6,587	6,952	7,529	8,461	9,762	10,410	10,879	11,406	12,006	12,209	13,029	13,651	14,520	16
22	4,707	5,144	5,093	5,918	6,565	6,894	7,521	7,716	7,940	8,204	8,185	8,575	8,818	9
23	3,582	3,724	3,642	3,955	4,431	4,526	4,746	5,044	5,044	5,059	5,095	4,954	5,060	5
24	2,693	2,807	2,693	2,921	3,027	3,161	3,335	3,461	3,650	3,616	3,594	3,588	3,456	3
17-24	42,554	46,290	48,007	53,350	57,179	60,006	62,959	65,715	68,422	71,288	75,096	79,840	85,002	90
25-29	9,575	10,288	9,392	10,329	10,368	10,222	10,330	10,569	10,887	11,274	11,569	11,737	11,785	11
30-34	6,814	7,406	6,824	7,854	8,166	8,248	8,453	8,594	8,638	8,665	8,732	8,856	9,087	9
35-39	5,308	5,911	5,489	6,049	6,401	6,611	6,931	7,237	7,585	7,932	8,257	8,525	8,732	8
40+	8,062	9,266	8,992	10,332	11,026	11,842	12,709	13,647	14,645	15,742	16,902	18,160	19,508	20
Total	72,313	79,161	78,704	87,940	93,162	98,020	103,737	109,829	116,199	122,926	129,965	137,402	145,285	153
% change		9.5%	-0.6%	11.7%	5.9%	5.2%	5.8%	5.9%	5.8%	5.8%	5.7%	5.7%	5.7%	5

Table 2a Total Population Change

Age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2
							Dept of Statistics Demographic Projections series 8							
15	60,070	58,540	55,020	53,370	52,800	51,290	50,570	52,090	51,800	50,070	50,080	50,740	51,630	53
16	61,820	60,320	59,150	56,590	53,390	52,820	51,310	50,590	52,110	51,830	50,100	50,110	50,770	51
17	61,680	62,150	60,200	57,950	56,570	53,370	52,800	51,300	50,580	52,090	51,810	50,080	50,090	50
18	60,930	62,690	60,430	59,530	57,870	56,480	53,290	52,720	51,220	50,500	52,020	51,730	50,010	50
19	58,890	61,810	62,410	61,240	59,340	57,680	56,300	53,120	52,540	51,050	50,430	51,850	51,560	49
20	55,940	59,370	60,850	59,140	60,870	58,970	57,320	55,940	52,750	52,180	50,690	49,980	51,490	51
21	53,510	55,180	57,830	57,730	58,500	60,220	58,330	56,680	55,300	52,120	51,550	50,060	49,350	50
22	51,230	54,310	53,420	55,270	56,930	57,700	59,420	57,540	55,890	54,510	51,340	50,770	49,280	48
23	50,820	52,260	53,550	53,090	54,650	56,300	57,080	58,800	56,920	55,270	53,890	50,720	50,150	48
24	51,980	51,700	52,190	52,050	52,830	54,380	56,040	56,810	58,530	56,650	55,000	53,630	50,460	49
17-24	444,980	459,470	460,880	456,000	457,560	455,100	450,580	442,910	433,730	424,370	416,630	408,820	402,490	399
25-29	269,970	278,090	279,870	278,700	275,100	272,700	272,200	275,100	279,900	286,300	290,200	290,800	288,400	282
30-34	253,170	266,050	273,930	277,000	282,900	287,700	290,200	290,400	287,300	283,700	281,400	280,900	283,700	288
35-39	239,760	237,740	241,270	249,300	254,200	258,900	265,200	270,500	277,000	283,000	287,800	290,300	290,500	287
40+	1,180,770	1,180,870	1,200,710	1257220	1282700	1,308,870	1,335,260	1,362,970	1,390,390	1,420,620	1,449,940	1,480,870	1,512,200	1,545
Total	2,510,540	2,541,080	2,570,830	2,628,180	2,658,650	2,687,380	2,715,320	2,744,560	2,772,230	2,799,890	2,826,150	2,852,540	2,879,590	2,907

Table 1a Age Specific Participation Rates at Universities

								Logistic Regression					
Age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15	0.00%	0.00%	0.00%	0.02%	0.02%	0.02%	0.02%	0.03%	0.03%	0.03%	0.04%	0.04%	0.05%	0.05%
16	0.00%	0.00%	0.00%	0.03%	0.02%	0.02%	0.01%	0.01%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%
17	1.16%	0.99%	1.11%	0.90%	0.61%	0.62%	0.54%	0.47%	0.41%	0.36%	0.31%	0.27%	0.24%	0.21%
18	12.98%	14.09%	14.69%	15.34%	15.76%	16.80%	17.64%	18.52%	19.44%	20.41%	21.42%	22.49%	23.61%	24.79%
19	14.61%	15.50%	16.42%	19.08%	20.17%	21.98%	23.94%	26.07%	28.38%	30.91%	33.65%	36.65%	39.90%	43.45%
20	13.95%	14.54%	15.21%	18.19%	19.65%	21.23%	23.25%	25.46%	27.88%	30.53%	33.44%	36.62%	40.10%	43.92%
21	12.31%	12.60%	13.02%	14.66%	16.69%	17.29%	18.65%	20.12%	21.71%	23.43%	25.27%	27.27%	29.42%	31.74%
22	9.19%	9.47%	9.53%	10.71%	11.53%	11.95%	12.66%	13.41%	14.21%	15.05%	15.94%	16.89%	17.89%	18.96%
23	7.05%	7.13%	6.80%	7.45%	8.11%	8.04%	8.30%	8.58%	8.86%	9.15%	9.45%	9.77%	10.09%	10.42%
24	5.18%	5.43%	5.16%	5.61%	5.73%	5.81%	5.95%	6.09%	6.24%	6.38%	6.54%	6.69%	6.85%	7.01%
17-24	9.56%	10.07%	10.42%	11.70%	12.50%	13.26%	14.20%	15.20%	16.28%	17.44%	18.67%	19.99%	21.41%	22.93%
25-29	3.55%	3.70%	3.36%	3.71%	3.77%	3.75%	3.79%	3.84%	3.89%	3.94%	3.99%	4.04%	4.09%	4.14%
30-34	2.69%	2.78%	2.49%	2.84%	2.89%	2.87%	2.91%	2.96%	3.01%	3.05%	3.10%	3.15%	3.20%	3.25%
35-39	2.21%	2.49%	2.28%	2.43%	2.52%	2.55%	2.61%	2.68%	2.74%	2.80%	2.87%	2.94%	3.01%	3.08%
40+	0.68%	0.78%	0.75%	0.82%	0.86%	0.90%	0.95%	1.00%	1.05%	1.11%	1.17%	1.23%	1.29%	1.36%
Total	2.88%	3.12%	3.06%	3.35%	3.50%	3.65%	3.82%	4.00%	4.19%	4.39%	4.60%	4.82%	5.05%	5.28%

Table 1b Enrolment Change Schools

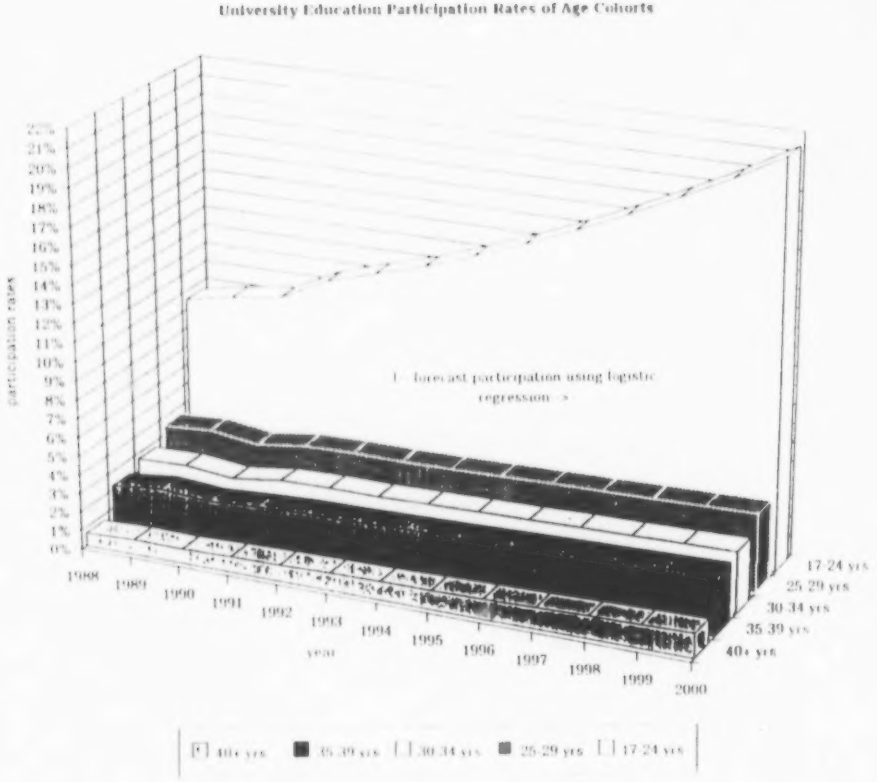
								Forecast Enrolments					
Age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15	54,280	54,391	51,661	50,365	49,640	49,125	48,895	50,843	51,040	49,803	50,286	51,433	52,831	54,944
16	46,129	46,439	45,989	46,686	45,101	46,001	46,126	46,945	49,914	51,246	51,132	52,791	55,211	57,978
17	25,785	29,685	29,384	31,503	33,633	34,324	36,910	38,980	41,774	46,762	50,556	53,117	57,747	63,595
18	4,864	6,093	5,275	6,834	8,188	8,531	9,177	10,351	11,465	12,888	15,136	17,160	18,914	21,568
19	1,098	1,685	1,810	2,130	919	1,336	1,290	1,204	1,178	1,132	1,104	1,125	1,107	1,058
Total	132,156	138,293	134,119	137,518	137,481	139,317	142,398	148,322	155,371	161,832	168,214	175,625	185,809	199,144
16-19	77,866	83,902	82,458	87,153	87,841	90,192	93,503	97,479	104,332	112,029	117,928	124,193	132,978	144,199

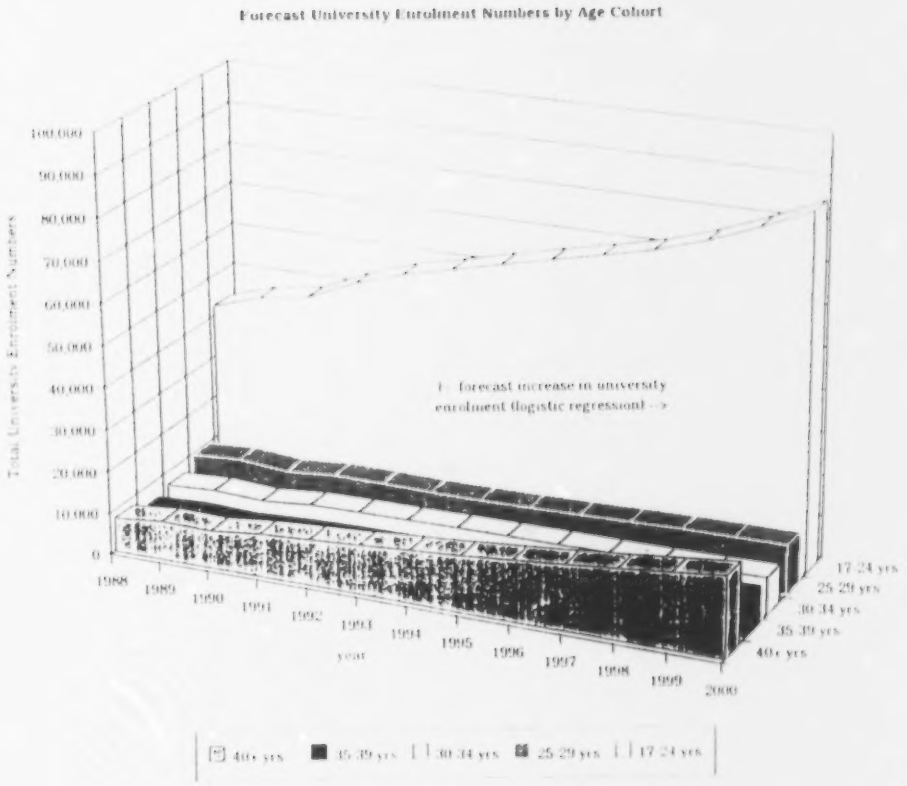
Table 2b Total Population Change

								Dept of Statistics Demographic Projections series 8					
Age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15	60,050	58,540	55,020	53,370	52,800	51,290	50,570	52,090	51,800	50,070	50,080	50,740	51,630	53,190
16	61,820	60,320	59,150	56,590	53,790	52,820	51,310	50,590	52,110	51,830	50,100	50,110	50,770	51,650
17	61,680	62,150	60,200	57,950	56,570	53,370	52,800	51,300	50,580	52,090	51,810	50,080	50,090	50,750
18	60,930	62,680	60,430	59,530	57,870	56,480	54,290	52,720	51,220	50,500	52,070	51,730	50,010	50,020
19	58,890	61,810	62,410	61,240	59,340	57,680	56,300	53,120	52,540	51,050	50,330	51,850	51,560	49,840
Total	303,390	305,510	297,210	288,680	279,970	271,640	264,270	259,820	258,250	255,540	254,340	254,510	254,060	255,450
16-19	243,320	246,970	242,190	235,310	227,170	220,350	213,700	207,730	206,450	205,470	204,260	203,770	202,430	202,260

Table 3b Age Specific Participation Rates at School

								Logistic Regression					
Age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15	90.38%	92.91%	93.89%	94.37%	94.02%	95.78%	96.69%	97.61%	98.53%	99.47%	100.41%	101.36%	102.33%	103.30%
16	74.62%	76.99%	77.75%	82.50%	84.47%	87.09%	89.90%	92.79%	95.79%	98.87%	102.06%	105.35%	108.75%	112.25%
17	41.80%	47.76%	48.81%	54.36%	59.45%	64.31%	69.91%	75.98%	82.59%	89.77%	97.58%	106.06%	115.29%	125.31%
18	7.98%	9.72%	8.74%	11.48%	14.15%	15.10%	17.22%	19.63%	22.38%	25.52%	29.10%	33.17%	37.82%	43.12%
19	1.85%	2.73%	2.90%	3.48%	1.55%	2.32%	2.29%	2.27%	2.24%	2.22%	2.19%	2.17%	2.15%	2.12%
Total	43.56%	45.27%	45.14%	47.64%	49.11%	50.30%	51.78%	53.31%	54.88%	56.50%	58.17%	59.88%	61.65%	63.47%
16-19	32.00%	33.97%	33.05%	37.04%	38.67%	40.31%	42.23%	44.24%	46.34%	48.55%	50.86%	53.28%	55.81%	58.47%


University Education Participation Rates of Age Cohorts
participation rates
21%
20%
19%
18%
17%
16%
15%
14%
13%
12%
11%
10%
9%
8%
7%
6%
5%
4%
3%
2%
1%
0%
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
year
17-24 yrs
25-29 yrs
30-34 yrs
35-39 yrs
40+ yrs
forecast participation using logistic regression
40+ yrs
35-39 yrs
30-34 yrs
25-29 yrs
17-24 yrs


Forecast University Enrolment Numbers by Age Cohort
Total University Enrolment Numbers
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
year
17-24 yrs
25-29 yrs
30-34 yrs
35-39 yrs
40+ yrs
<-- forecast increase in university
enrolment (logistic regression) -->
40+ yrs
35-39 yrs
30-34 yrs
25-29 yrs
17-24 yrs

Participation Rate Analysis

[Model 2 Linear Regression]

Table 1a Enrolment Change Universities				Forecast Enrolments										
Age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15				9	10	11	12	13	14	15	16	17	18	20
16				17	12	8	4	0	-4	-8	11	15	19	24
17	718	613	670	523	346	320	253	185	123	64	2	-57	117	179
18	7,857	8,843	8,858	9,132	9,120	9,103	9,244	9,513	9,600	9,817	10,476	10,779	10,769	11,129
19	8,686	9,583	10,246	11,684	11,967	12,436	12,965	13,013	13,642	14,005	14,546	15,747	16,415	16,600
20	7,801	8,631	9,256	10,756	11,961	12,278	12,797	13,331	13,364	14,005	14,367	14,918	16,143	16,826
21	6,587	6,952	7,529	8,461	9,762	10,296	10,604	10,917	11,249	11,165	11,601	11,807	12,173	13,095
22	4,707	5,144	5,093	5,918	6,565	6,845	7,401	7,508	7,624	7,758	7,611	7,827	7,880	8,064
23	3,582	3,724	3,642	3,955	4,431	4,526	4,728	5,014	4,993	4,983	4,991	4,821	4,889	4,864
24	2,693	2,807	2,693	2,921	3,027	3,158	3,326	3,444	3,623	3,579	3,546	3,526	3,382	3,408
15-24	42,554	46,290	48,007	53,350	57,179	59,263	61,319	62,925	64,217	65,378	67,140	69,367	71,545	73,798
25-29	9,575	10,288	9,892	10,329	10,368	10,228	10,332	10,566	10,877	11,254	11,539	11,694	11,727	11,598
30-34	6,814	7,406	6,824	7,854	8,166	8,258	8,457	8,592	8,627	8,644	8,698	8,807	9,020	9,300
35-39	5,308	5,911	5,489	6,049	6,401	6,598	6,904	7,190	7,515	7,833	8,124	8,354	8,519	8,585
40+	8,062	9,266	8,992	10,332	11,026	11,738	12,496	13,288	14,099	14,960	15,836	16,752	17,698	18,686
Total	72,313	79,161	78,704	87,940	93,162	97,415	102,442	107,602	112,785	118,650	123,334	128,703	134,180	139,798
% change		9.5%	-0.6%	11.7%	5.9%	4.6%	5.2%	5.0%	4.8%	4.7%	4.5%	4.4%	4.3%	4.2%

Table 2a Total Population Change				Dept of Statistics Demographic Projections series 8										
Age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15	60,020	58,540	55,020	53,370	52,800	51,290	50,570	52,090	51,800	50,070	50,080	50,740	51,630	53,190
16	61,830	60,330	59,150	56,590	53,390	52,820	51,310	50,590	52,110	51,830	50,100	50,110	50,770	51,650
17	63,690	62,150	60,200	57,950	56,570	53,370	52,800	51,300	50,580	52,090	51,810	50,080	50,090	50,750
18	60,930	62,690	60,430	59,580	57,870	56,480	53,290	52,720	51,220	50,500	52,020	51,730	50,010	50,020
19	58,900	61,810	62,430	61,240	59,340	57,680	56,300	53,120	52,540	51,050	50,380	51,850	51,560	49,840
20	55,940	59,370	60,850	59,140	60,870	58,970	57,320	55,940	52,750	52,180	50,690	49,980	51,490	51,210
21	53,510	55,180	57,830	57,730	58,500	60,220	58,430	56,680	55,300	52,120	51,550	50,060	49,350	50,860
22	51,730	54,310	53,420	55,270	56,930	57,700	59,420	57,540	55,890	54,510	51,340	50,770	49,280	48,570
23	50,830	52,260	53,550	53,090	54,650	56,300	57,080	58,800	56,920	55,270	53,890	50,720	50,150	48,670
24	51,980	51,700	52,190	52,050	52,830	54,380	56,040	56,810	58,530	56,650	55,000	53,630	50,460	49,900
15-24	443,980	459,470	460,880	456,000	457,560	455,100	450,580	442,910	433,730	424,370	416,630	408,820	402,390	399,820
25-29	269,930	278,090	279,870	278,700	275,100	272,700	272,200	275,100	279,900	286,300	290,200	290,800	288,400	282,100
30-34	254,470	266,050	273,910	277,000	282,900	287,700	290,200	290,400	287,300	283,700	281,400	280,900	283,700	288,500
35-39	240,260	247,740	241,270	249,300	254,200	258,900	265,200	270,500	277,000	283,000	287,800	290,300	290,500	287,400
40+	1,380,770	1,380,820	1,280,710	1257220	1282700	1,308,870	1,335,260	1,362,970	1,390,390	1,420,620	1,449,940	1,480,870	1,512,200	1,545,070
Total	2,589,410	2,632,170	2,536,640	2,628,180	2,658,650	2,687,080	2,715,320	2,744,560	2,772,230	2,799,890	2,826,150	2,852,540	2,879,590	2,907,780

Table 3a Age Specific Participation Rates at Universities

						Linear Regression								
Age	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
15	0.00%	0.00%	0.00%	0.02%	0.02%	0.02%	0.02%	0.03%	0.03%	0.03%	0.03%	0.03%	0.04%	0.04%
16	0.00%	0.00%	0.00%	0.03%	0.02%	0.01%	0.01%	0.00%	-0.01%	-0.02%	-0.02%	-0.03%	-0.04%	-0.05%
17	1.16%	0.99%	1.11%	0.90%	0.61%	0.60%	0.48%	0.36%	0.24%	0.12%	0.00%	-0.11%	-0.23%	-0.35%
18	12.90%	14.09%	14.69%	15.34%	15.76%	16.65%	17.35%	18.04%	18.74%	19.44%	20.14%	20.84%	21.53%	22.23%
19	14.61%	15.50%	16.42%	19.08%	20.17%	21.56%	23.03%	24.50%	25.96%	27.43%	28.90%	30.37%	31.84%	33.31%
20	13.95%	14.54%	15.21%	18.19%	19.65%	20.82%	22.33%	23.83%	25.33%	26.84%	28.34%	29.85%	31.35%	32.86%
21	12.31%	12.60%	13.02%	14.66%	16.69%	17.10%	18.18%	19.26%	20.34%	21.42%	22.50%	23.59%	24.67%	25.75%
22	9.19%	9.47%	9.53%	10.71%	11.53%	11.86%	12.46%	13.05%	13.64%	14.23%	14.83%	15.42%	16.01%	16.60%
23	7.05%	7.13%	6.80%	7.45%	8.11%	8.04%	8.28%	8.53%	8.77%	9.02%	9.26%	9.51%	9.75%	9.99%
24	5.18%	5.43%	5.16%	5.61%	5.73%	5.81%	5.93%	6.06%	6.19%	6.32%	6.45%	6.57%	6.70%	6.83%
17-24	9.56%	10.07%	10.42%	11.70%	12.50%	13.10%	13.85%	14.60%	15.35%	16.09%	16.84%	17.59%	18.34%	19.09%
25-29	3.55%	3.70%	3.36%	3.71%	3.77%	3.75%	3.80%	3.84%	3.89%	3.93%	3.98%	4.02%	4.07%	4.11%
30-34	2.69%	2.78%	2.49%	2.84%	2.89%	2.87%	2.91%	2.96%	3.00%	3.05%	3.09%	3.14%	3.18%	3.22%
35-39	2.21%	2.49%	2.28%	2.43%	2.52%	2.55%	2.60%	2.66%	2.71%	2.77%	2.82%	2.88%	2.93%	2.99%
40+	0.68%	0.78%	0.75%	0.82%	0.86%	0.90%	0.94%	0.97%	1.01%	1.05%	1.09%	1.13%	1.17%	1.21%
Total	2.88%	3.12%	3.06%	3.35%	3.50%	3.62%	3.77%	3.92%	4.07%	4.22%	4.36%	4.51%	4.66%	4.81%

Table 1b Enrolment Change - Schools

						Forecast Enrolments								
Age	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
15	54,290	54,391	51,661	50,365	49,640	49,102	48,854	50,777	50,947	49,682	50,130	51,233	52,583	54,636
16	46,129	46,439	45,989	46,686	45,101	45,865	45,848	46,481	49,192	50,235	49,822	51,096	53,049	55,272
17	25,785	29,685	29,384	31,503	33,633	33,627	35,481	36,622	38,227	41,551	43,498	44,144	46,251	48,987
18	4,864	6,093	5,275	6,834	8,188	8,269	8,553	9,204	9,664	10,240	11,281	11,947	12,255	12,962
19	1,088	1,685	1,810	2,130	919	1,469	1,442	1,369	1,362	1,331	1,320	1,368	1,369	1,331
Total	132,156	138,293	134,119	137,518	137,481	138,332	140,178	144,453	149,392	153,039	156,051	159,789	165,507	173,188
16-19	77,866	83,902	82,458	87,153	87,841	89,230	91,324	93,676	98,445	103,357	105,922	108,555	112,924	118,552

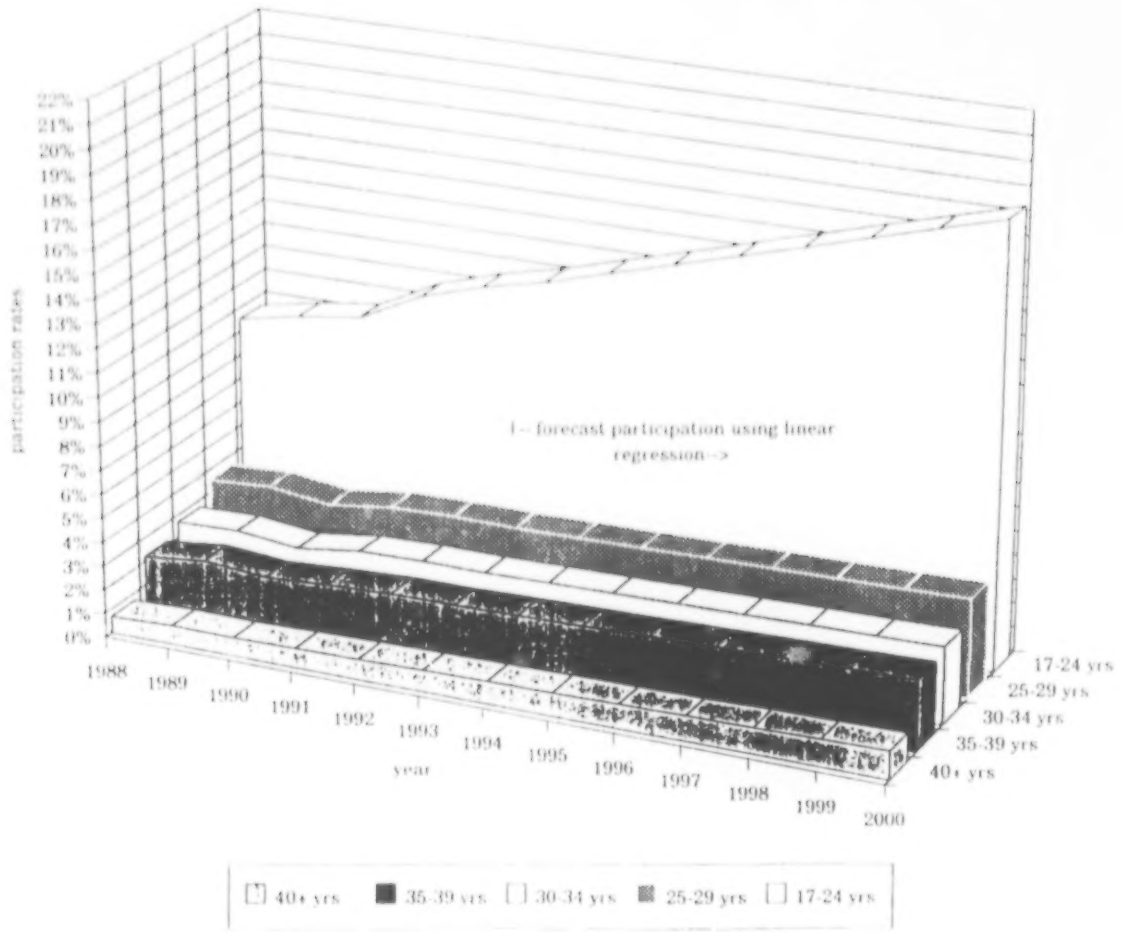
Table 2b Total Population Change

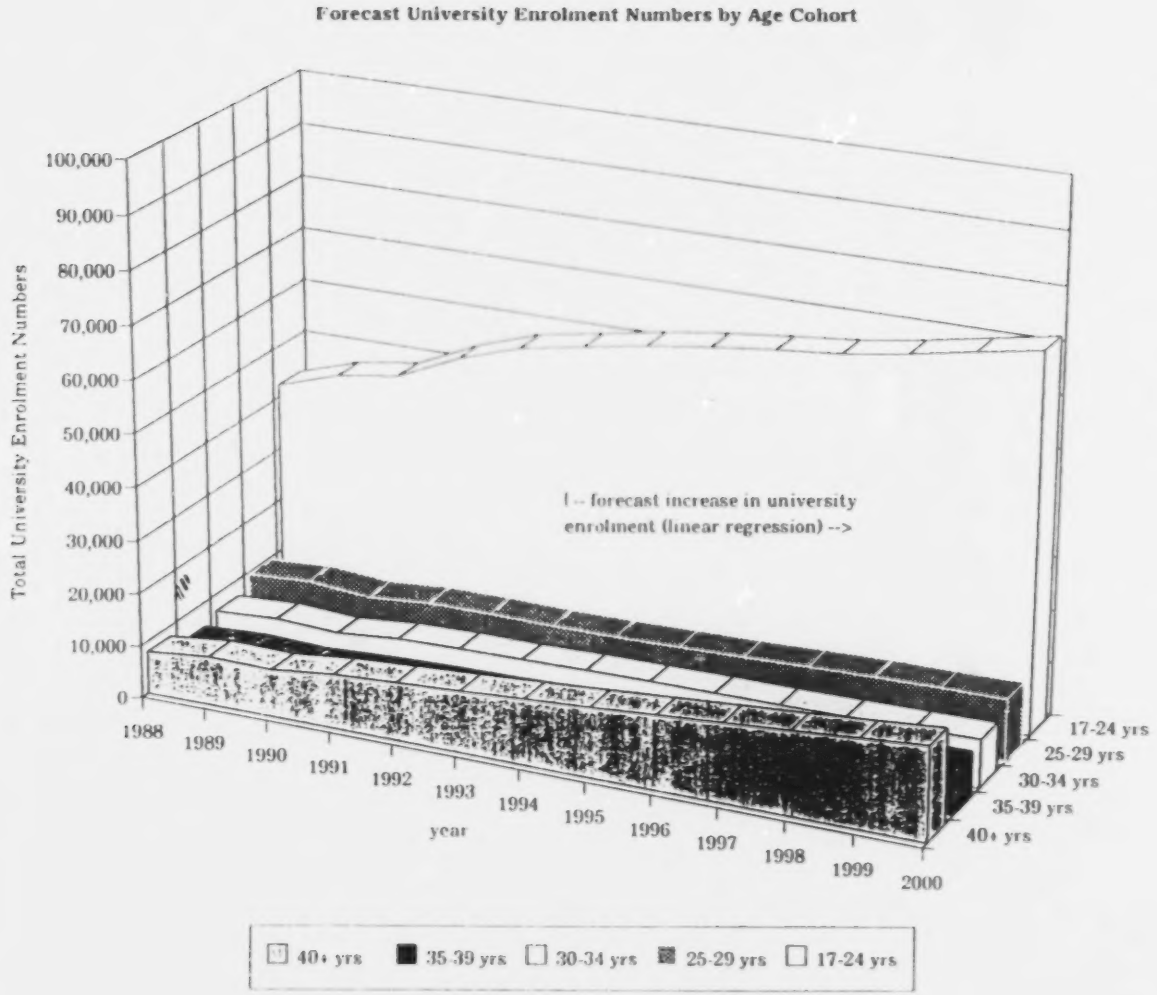
						Dept of Statistics Demographic Projections series 8								
Age	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
15	60,070	58,540	55,020	53,370	52,800	51,290	50,570	52,090	51,800	50,070	50,080	50,740	51,630	53,190
16	61,820	60,320	59,150	56,590	53,390	52,820	51,310	50,590	52,110	51,830	50,100	50,110	50,770	51,650
17	61,680	62,150	60,200	57,950	56,570	53,370	52,800	51,300	50,580	52,090	51,810	50,080	50,090	50,750
18	60,930	62,690	60,430	59,530	57,870	56,480	53,290	52,720	51,220	50,500	52,020	51,730	50,010	50,020
19	58,890	61,810	62,410	61,240	59,340	57,680	56,300	53,120	52,540	51,050	50,330	51,850	51,560	49,840
Total	303,390	305,510	297,210	288,680	279,970	271,640	264,270	259,820	258,250	255,540	254,340	254,510	254,060	255,450
16-19	243,320	246,970	242,190	235,310	227,170	220,350	213,700	207,730	206,450	205,470	204,260	203,770	202,430	202,260

Table 3b Age Specific Participation Rates at School

						Logistic Regression								
Age	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
15	90.38%	92.91%	93.89%	94.37%	94.02%	95.73%	96.61%	97.48%	98.35%	99.23%	100.10%	100.97%	101.85%	102.72%
16	74.62%	76.99%	77.75%	82.56%	84.47%	86.83%	89.36%	91.88%	94.40%	96.92%	99.44%	101.97%	104.49%	107.01%
17	41.80%	47.76%	48.81%	54.36%	59.45%	63.01%	67.20%	71.39%	75.58%	79.77%	83.96%	88.15%	92.34%	96.53%
18	7.98%	9.72%	8.73%	11.48%	14.15%	14.64%	16.95%	17.46%	18.87%	20.28%	21.69%	23.10%	24.50%	25.91%
19	1.85%	2.73%	2.90%	3.48%	1.55%	2.55%	2.56%	2.58%	2.59%	2.61%	2.62%	2.64%	2.65%	2.67%
Total	43.56%	45.27%	45.13%	47.64%	49.11%	50.18%	51.52%	52.87%	54.22%	55.56%	56.91%	58.25%	59.60%	60.95%
16-19	32%	34%	34%	37%	39%	40%	42%	43%	45%	47%	48%	50%	52%	53%

University Education Participation Rates of Age Cohorts




Forecast University Enrolment Numbers by Age Cohort
Total University Enrolment Numbers
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
year
17-24 yrs
25-29 yrs
30-34 yrs
35-39 yrs
40+ yrs
I -- forecast increase in university enrolment (linear regression) -->
40+ yrs
35-39 yrs
30-34 yrs
25-29 yrs
17-24 yrs

Participation Rate Analysis

(Model 3 no growth in participation)

Table 1a Enrolment Change - Universities									Forecast Enrolments					
Age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15				9	10	11	11	11	11	11	11	11	11	11
16				17	12	9	9	9	9	9	8	8	9	9
17	718	613	670	523	346	329	326	317	312	321	320	309	309	313
18	7,857	8,833	8,878	9,132	9,120	9,488	8,953	8,857	8,605	8,484	8,739	8,690	8,401	8,403
19	8,606	9,583	10,246	11,684	11,967	12,680	12,377	11,678	11,550	11,223	11,064	11,399	11,335	10,957
20	7,804	8,634	9,256	10,756	11,961	12,518	12,168	11,875	11,198	11,077	10,760	10,610	10,930	10,871
21	6,587	6,952	7,529	8,461	9,762	10,410	10,083	9,798	9,559	9,010	8,911	8,653	8,531	8,792
22	4,707	5,144	5,093	5,918	6,565	6,894	7,099	6,875	6,678	6,513	6,134	6,066	5,888	5,803
23	3,582	3,724	3,642	3,955	4,431	4,526	4,589	4,727	4,576	4,443	4,332	4,077	4,031	3,912
24	2,693	2,807	2,693	2,921	3,027	3,161	3,257	3,302	3,402	3,293	3,197	3,117	2,933	2,900
17-24	42,554	46,290	48,007	53,350	57,179	60,006	58,851	57,427	55,879	54,363	53,458	52,921	52,359	51,951
25-29	9,575	10,288	9,392	10,329	10,368	10,222	10,203	10,312	10,492	10,732	10,878	10,900	10,810	10,574
30-34	6,814	7,406	6,824	7,854	8,166	8,248	8,320	8,326	8,237	8,134	8,068	8,053	8,134	8,271
35-39	5,308	5,911	5,489	6,049	6,401	6,611	6,772	6,907	7,073	7,226	7,349	7,413	7,418	7,338
40+	8,062	9,266	8,992	10,332	11,026	11,842	12,081	12,331	12,579	12,853	13,118	13,398	13,682	13,979
Total	72,313	79,161	78,704	87,940	93,162	98,020	99,039	100,105	101,114	102,123	103,081	104,044	105,030	106,057
% change		9.5%	-0.6%	11.7%	5.9%	5.2%	1.0%	1.1%	1.0%	1.0%	0.9%	0.9%	0.9%	1.0%

Table 2a Total Population Change								Dept of Statistics Demographic Projections series 8						
Age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15	60,070	58,540	55,020	53,370	52,800	51,290	50,570	52,090	51,800	50,070	50,080	50,740	51,630	53,190
16	61,820	60,320	59,150	56,590	53,390	52,820	51,310	50,590	52,110	51,830	50,100	50,110	50,770	51,650
17	61,680	62,150	60,200	57,950	56,570	53,370	52,800	51,300	50,580	52,090	51,810	50,080	50,090	50,750
18	60,930	62,690	60,430	59,530	57,870	56,480	53,290	52,720	51,220	50,500	52,020	51,730	50,010	50,020
19	58,890	61,810	62,410	61,240	59,340	57,680	56,300	53,120	52,540	51,050	50,330	51,850	51,560	49,840
20	55,940	59,370	60,850	59,140	60,870	58,970	57,320	55,940	52,750	52,180	50,690	49,980	51,490	51,210
21	53,510	55,180	57,830	57,730	58,500	60,220	58,330	56,680	55,300	52,120	51,550	50,060	49,350	50,860
22	51,230	54,310	53,420	55,270	56,930	57,700	59,420	57,540	55,890	54,510	51,340	50,770	49,280	48,570
23	50,820	52,260	53,550	53,090	54,650	56,300	57,080	58,800	56,920	55,270	53,890	50,720	50,150	48,670
24	51,980	51,700	52,190	52,050	52,830	54,380	56,040	56,810	58,530	56,650	55,000	53,630	50,460	49,900
17-24	444,980	459,470	460,880	456,000	457,560	455,100	450,580	442,910	433,730	424,370	416,630	408,820	402,390	399,820
25-29	269,970	278,090	279,870	278,700	275,100	272,700	272,200	275,100	279,900	286,300	290,200	290,800	288,400	282,100
30-34	253,170	266,050	273,930	277,000	282,900	287,700	290,200	290,400	287,300	283,700	281,400	280,900	283,700	288,500
35-39	239,760	237,740	241,270	249,300	254,200	258,900	265,200	270,500	277,000	283,000	287,800	290,300	290,500	287,400
40+	1,180,770	1,180,870	1,200,710	1257220	1282700	1,308,870	1,335,260	1,362,970	1,390,390	1,420,620	1,449,940	1,480,870	1,512,200	1,545,070
Total	2,510,540	2,541,080	2,570,830	2,628,180	2,658,650	2,687,380	2,715,320	2,744,560	2,772,230	2,799,890	2,826,150	2,852,540	2,879,590	2,907,730

Table 3a Age Specific Participation Rates at Universities — Hyperlinear Regression

Age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15	0.00%	0.00%	0.00%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
16	0.00%	0.00%	0.00%	0.03%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
17	1.16%	0.99%	1.11%	0.90%	0.61%	0.62%	0.62%	0.62%	0.62%	0.62%	0.62%	0.62%	0.62%	0.62%
18	12.90%	14.09%	14.69%	15.34%	15.76%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%	16.80%
19	14.61%	15.50%	16.42%	19.08%	20.17%	21.98%	21.98%	21.98%	21.98%	21.98%	21.98%	21.98%	21.98%	21.98%
20	13.95%	14.54%	15.21%	18.19%	19.65%	21.23%	21.23%	21.23%	21.23%	21.23%	21.23%	21.23%	21.23%	21.23%
21	12.31%	12.60%	13.02%	14.66%	16.69%	17.29%	17.29%	17.29%	17.29%	17.29%	17.29%	17.29%	17.29%	17.29%
22	9.19%	9.47%	9.53%	10.71%	11.53%	11.95%	11.95%	11.95%	11.95%	11.95%	11.95%	11.95%	11.95%	11.95%
23	7.05%	7.13%	6.80%	7.45%	8.11%	8.04%	8.04%	8.04%	8.04%	8.04%	8.04%	8.04%	8.04%	8.04%
24	5.18%	5.43%	5.16%	5.61%	5.73%	5.81%	5.81%	5.81%	5.81%	5.81%	5.81%	5.81%	5.81%	5.81%
17-24	9.56%	10.07%	10.42%	11.70%	12.50%	13.26%	13.26%	13.26%	13.26%	13.26%	13.26%	13.26%	13.26%	13.26%
25-29	3.55%	3.70%	3.36%	3.71%	3.77%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%	3.75%
30-34	2.69%	2.78%	2.49%	2.84%	2.89%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%	2.87%
35-39	2.21%	2.49%	2.28%	2.43%	2.52%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%	2.55%
40+	0.68%	0.78%	0.75%	0.82%	0.86%	0.90%	0.90%	0.90%	0.90%	0.90%	0.90%	0.90%	0.90%	0.90%
Total	2.88%	3.12%	3.06%	3.35%	3.50%	3.65%	3.65%	3.65%	3.65%	3.65%	3.65%	3.65%	3.65%	3.65%

Table 1b Enrolment Change - Schools — Forecast Enrolments

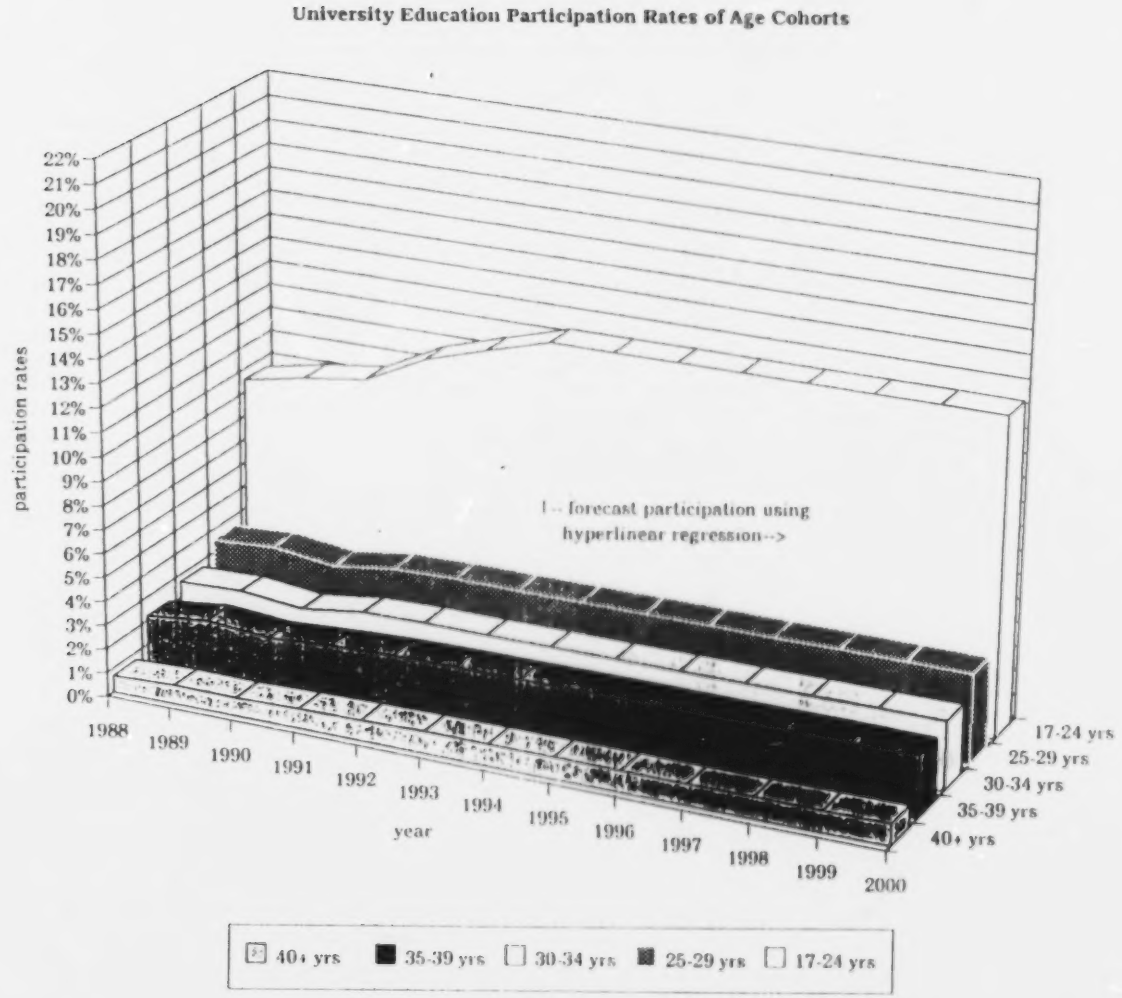
Age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15	54,290	54,391	51,661	50,365	49,640	49,125	48,435	49,891	49,614	47,957	47,966	48,598	49,451	50,945
16	46,129	46,439	45,989	46,686	45,101	46,001	44,685	44,058	45,382	45,138	43,632	43,640	44,215	44,982
17	25,785	29,685	29,384	31,503	33,633	34,324	33,957	32,992	32,529	33,501	33,320	32,208	32,214	32,639
18	4,864	6,093	5,275	6,834	8,188	8,531	8,049	7,963	7,737	7,628	7,858	7,814	7,554	7,555
19	1,088	1,685	1,810	2,130	919	1,336	1,305	1,231	1,217	1,183	1,166	1,201	1,195	1,155
Total	132,156	138,293	134,119	137,518	137,481	139,317	136,432	136,136	136,479	135,406	133,942	133,462	134,629	137,275
16-19	77,866	83,902	82,458	87,153	87,841	90,192	87,996	86,245	86,866	87,450	85,976	84,863	85,178	86,331

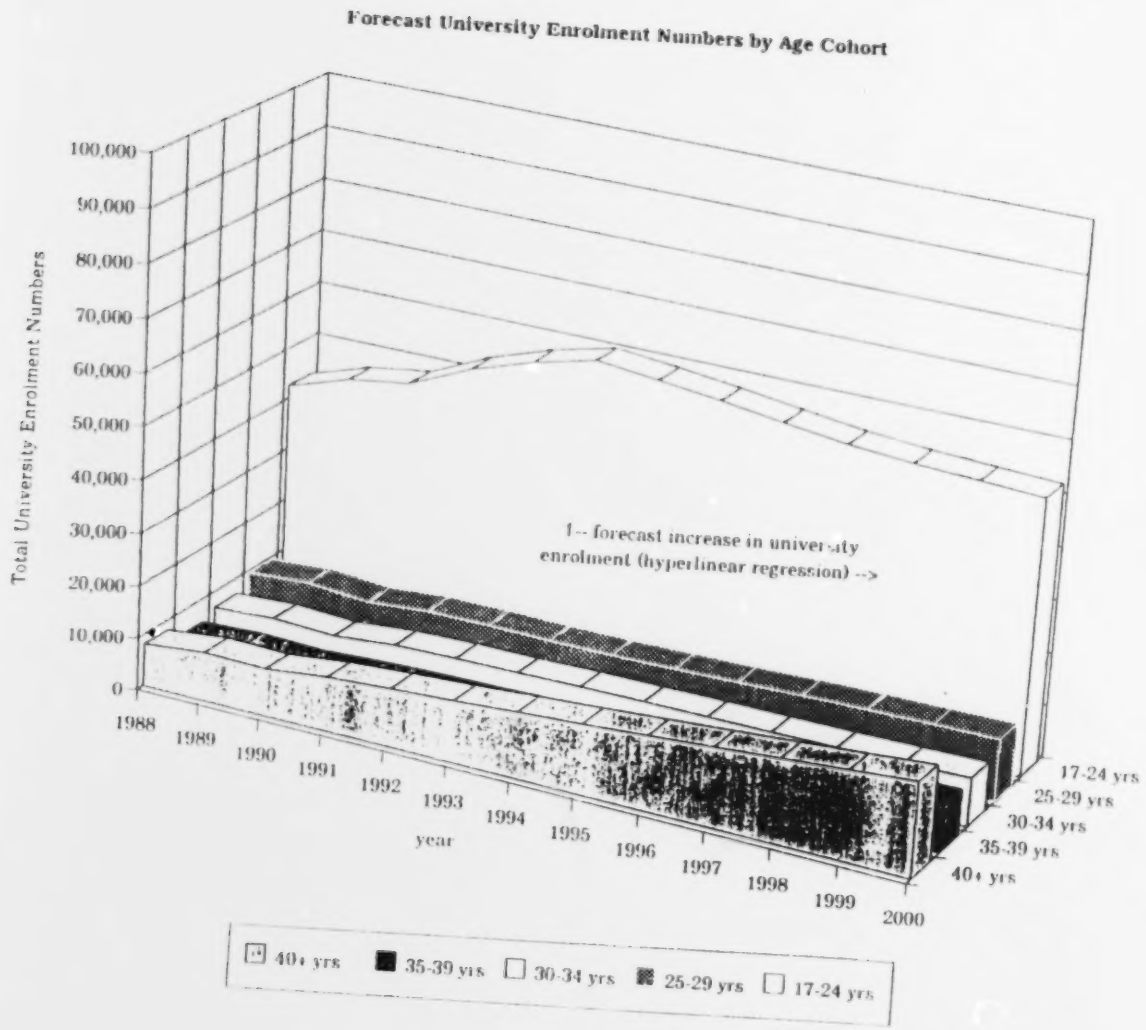
Table 2b Total Population Change — Dept of Statistics Demographic Projections series 8

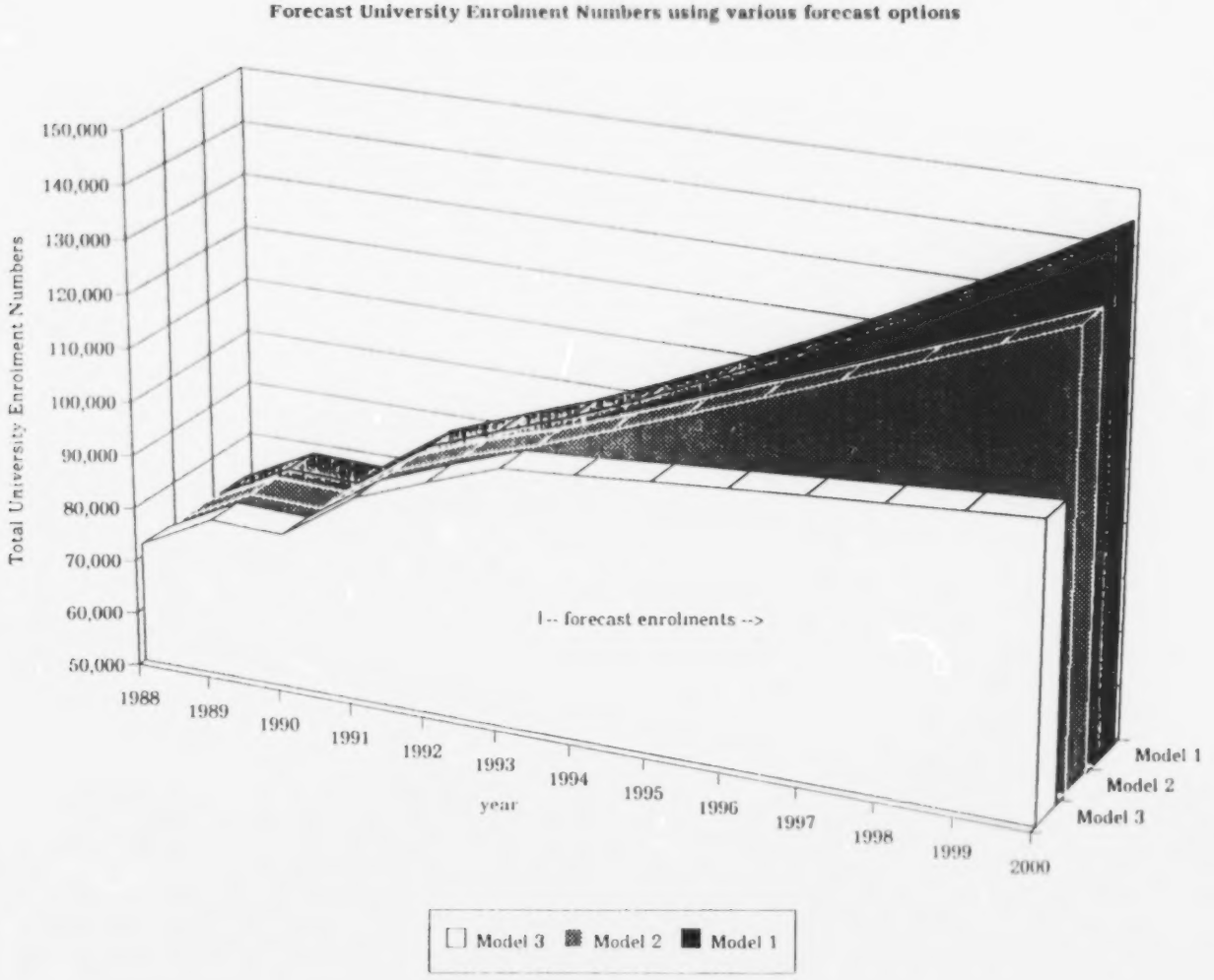
Age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15	60,070	58,540	55,020	53,370	52,800	51,290	50,570	52,090	51,800	50,070	50,080	50,740	51,630	53,190
16	61,820	60,320	59,150	56,590	53,390	52,820	51,310	50,590	52,110	51,830	50,100	50,110	50,770	51,650
17	61,680	62,150	60,200	57,950	56,570	53,370	52,800	51,300	50,580	52,090	51,810	50,080	50,090	50,750
18	60,930	62,690	60,430	59,530	57,870	56,480	53,290	52,720	51,220	50,500	52,020	51,730	50,010	50,020
19	58,890	61,810	62,410	61,240	59,340	57,680	56,300	53,120	52,540	51,050	50,330	51,850	51,560	49,840
Total	303,390	305,510	297,210	288,680	279,970	271,640	264,270	259,820	258,250	255,540	254,340	254,510	254,060	255,450
16-19	243,320	246,970	242,190	235,310	227,170	220,350	213,700	207,730	206,450	205,470	204,260	203,770	202,430	202,260

Table 3b Age Specific Participation Rates at School — Hyperlinear Regression

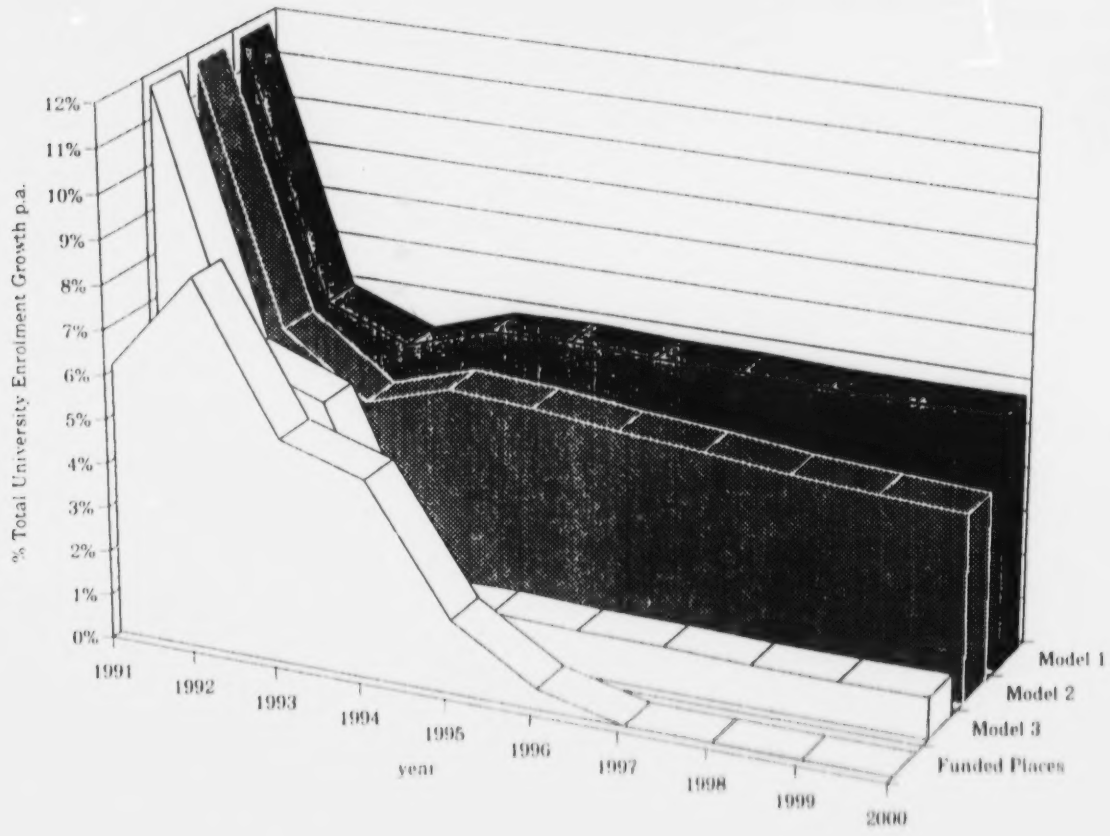
Age	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
15	90.38%	92.91%	93.89%	94.37%	94.02%	95.78%	95.78%	95.78%	95.78%	95.78%	95.78%	95.78%	95.78%	95.78%
16	74.62%	76.99%	77.75%	82.50%	84.47%	87.09%	87.09%	87.09%	87.09%	87.09%	87.09%	87.09%	87.09%	87.09%
17	41.80%	47.76%	48.81%	54.36%	59.45%	64.31%	64.31%	64.31%	64.31%	64.31%	64.31%	64.31%	64.31%	64.31%
18	7.98%	9.72%	8.73%	11.48%	14.15%	15.10%	15.10%	15.10%	15.10%	15.10%	15.10%	15.10%	15.10%	15.10%
19	1.85%	2.73%	2.90%	3.48%	1.55%	2.32%	2.32%	2.32%	2.32%	2.32%	2.32%	2.32%	2.32%	2.32%
Total	43.56%	45.27%	45.13%	47.64%	49.11%	50.30%	50.30%	50.30%	50.30%	50.30%	50.30%	50.30%	50.30%	50.30%
16-19	32.00%	33.97%	34.05%	37.04%	38.67%	40.31%	40.31%	40.31%	40.31%	40.31%	40.31%	40.31%	40.31%	40.31%


University Education Participation Rates of Age Cohorts
participation rates
22%
21%
20%
19%
18%
17%
16%
15%
14%
13%
12%
11%
10%
9%
8%
7%
6%
5%
4%
3%
2%
1%
0%
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
year
<-- forecast participation using
hyperlinear regression-->
17-24 yrs
25-29 yrs
30-34 yrs
35-39 yrs
40+ yrs
40+ yrs
35-39 yrs
30-34 yrs
25-29 yrs
17-24 yrs


Forecast University Enrolment Numbers by Age Cohort
Total University Enrolment Numbers
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
year
17-24 yrs
25-29 yrs
30-34 yrs
35-39 yrs
40+ yrs
1-- forecast increase in university enrolment (hyperlinear regression) -->
40+ yrs
35-39 yrs
30-34 yrs
25-29 yrs
17-24 yrs

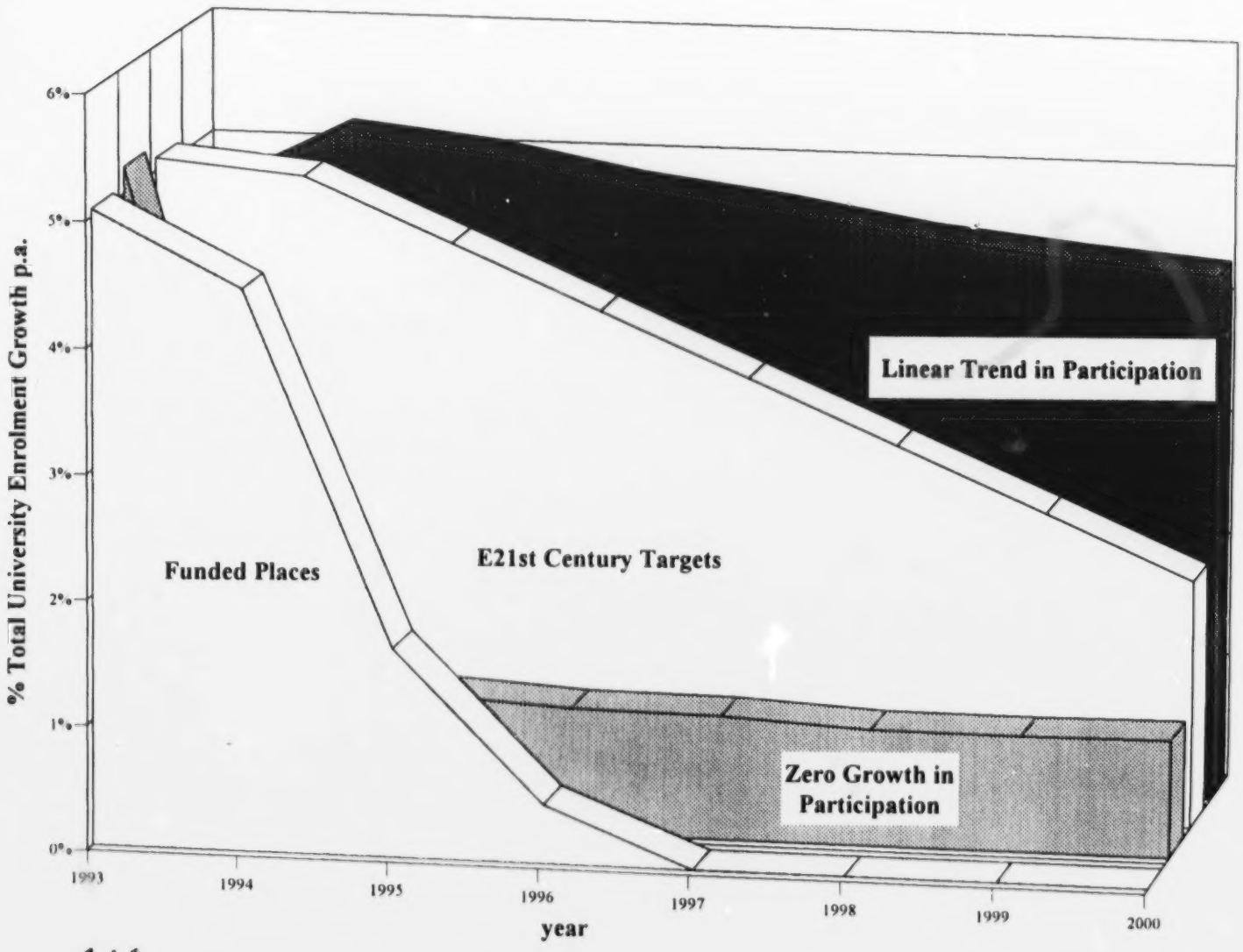

Forecast University Enrolment Numbers using various forecast options
Total University Enrolment Numbers
150,000
140,000
130,000
120,000
110,000
100,000
90,000
80,000
70,000
60,000
50,000
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
year
|-- forecast enrolments -->
Model 1
Model 2
Model 3
Model 3
Model 2
Model 1

Forecast % University Enrolment Growth p.a. vrs Growth in Funded Places



Funded Places Model 3 Model 2 Model 1

Forecast % University Enrolment Growth p.a. vrs Growth in Funded Places



The International Market for Academics

Dr Ed Vos
President, AUS

Introduction

Academics work in an international employment market. AUS figures show that at present approximately 60% of academic staff employed in New Zealand universities are recruited from overseas. While it is true that this figure includes New Zealand born graduates who have returned after completing postgraduate study overseas, approximately 40% of all appointees are overseas born and educated.

AUS believes that there are two key problems with the future staffing requirements of New Zealand universities:

> New Zealand is not producing enough postgraduate students to replace existing academic staff from the domestic pool; and
>
> as academic salaries and superannuation in New Zealand continue to fall behind international equivalents, New Zealand will be unable to recruit academic staff from overseas.

The "greying" of academia

As one would expect with an international profession, there are international problems. One such problem is that academia is an ageing profession.

Currently, in the United Kingdom the average age of academic staff is about 47 years. Only 15% of academics in the UK are under 35 years and 16% are over 55 years. In Canada, the average age is now 50 years, up from 45 in 1986.

In the United States there is no longer a specified retirement age for academic staff, therefore, an increasing number remain in the profession past the age of 65; in may cases past 70.

Closer to home, comparable data on the age of university staff is difficult to locate but figures provided to AUS show that at Auckland, 45% of academic staff are over 50, while for Canterbury, the comparable figure is 35%.

In New Zealand, this "greying of academia" points to a potential shortage of university staff in the wake of future retirements. It is of concern to the Association that neither the

universities nor the Government seem concerned enough about this to research and plan for the future staffing requirements of New Zealand universities.

The international market

The combination of the above factors could lead to a serious staffing crisis in our universities if nothing is done to improve opportunities for postgraduate study within New Zealand and incentives for recruitment from overseas.

As stated earlier, up to 60% of academics working in our universities are recruited from overseas. To continue to attract new staff, salaries will have to be internationally competitive. Academic entry level salaries in New Zealand are currently about 50 - 60% of those offered overseas and have remained static since 1990.

New Zealand's "clean, green" image is unlikely to be a strong enough compensation for internationally uncompetitive salaries.

Superannuation in New Zealand is also internationally uncompetitive. For example, the employer contribution in New Zealand is 6.75% compared with 17% in Australia and 18.55% in the United Kingdom. There are additional tax complications if overseas born academics who choose to retire to their country of origin.

New Zealand's immigration policies further mitigate against overseas recruitment. New Zealand has a points system which assess candidates on criteria such as age, wealth, health, number of children, etc. Many academic applicants struggle to achieve the requisite points rating because they are both too old and too poor. A "career list" system would make more sense as it would allow gaps in the labour market to be filled on a more rational basis.

Migration could also pose a problem for New Zealand's academic workforce. As we have already stated, academics work in an international market. What, therefore, are the incentives for New Zealand born academics to stay in New Zealand or to return to New Zealand after completing postgraduate study overseas?

It is also probable that uncompetitive salaries will induce academic staff to leave New Zealand or to leave academia for higher salaries in other areas of the labour market.

A further concern of the Association's is that staff numbers, both for academic staff and general staff, are not keeping pace with increased enrolments in universities. The focus of the institutions appears to be on throughput rather than on quality.

In 1987, the Watts Report found that a staff:student ratio of 1:13 was as high as would be desirable in New Zealand.

Staff:student ratios in 1993 have reached a level of about 1:19 with the average number of students enroled in a course being 130. University class sizes are, therefore, considerably larger than class sizes in the compulsory sector.

In the interest of maintaining quality and of containing staff workloads, universities ought to employ more academic staff and more general staff. Currently, the ratio of academic staff to general staff is less than 1:1.

Senior academic staff are finding it increasingly difficult to focus on teaching and research as they are required to take on administrative roles within the institutions.

Conclusion

In conclusion, the Association finds that it must question current funding policies for tertiary institutions. The EFTS funding policy is focused on enrolments - the more students, the more money the institution gains. AUS must ask, where is the focus on quality?

The Association must also question a university system that allows institutions to amass cash reserves and to embark on building programmes while the quality of the education being offered to students declines and while staff stress and workloads increase.

Acknowledgement: *this paper was prepared with the help of AUS Research Officer, Charlotte Fitzgerald.*

The International Picture

In the UK in 1987-88:

Average age:	**44.6 yrs**
Under 35:	**15%**
Over 55:	**16%**

In Canada in 1985-86:		**Now:**
Average age:	**45, (47 in engineering)**	**50**

In the US:

No retirement age, thus an increase of those over 65!

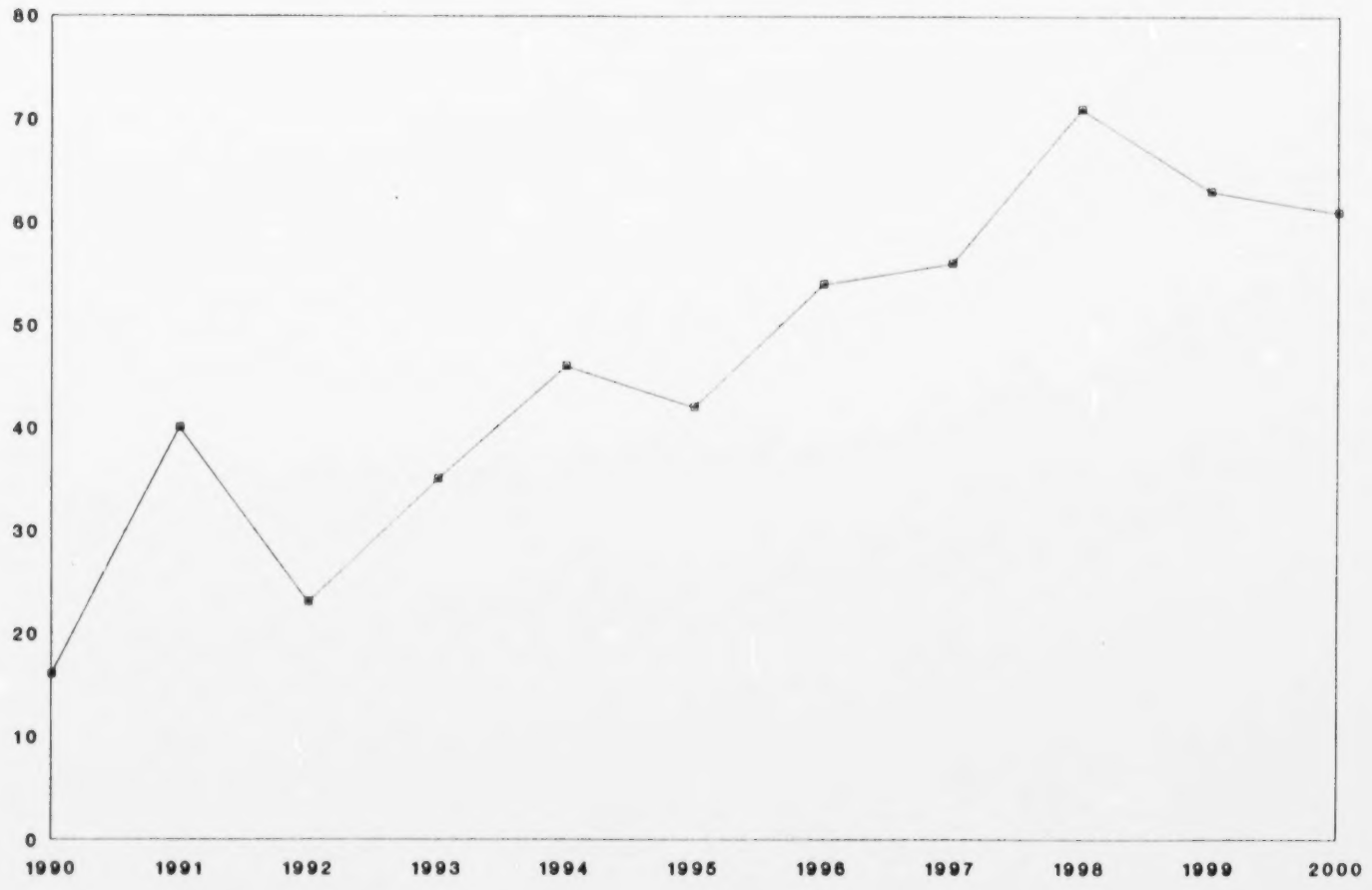
University of Auckland: 45% over 50

University of Canterbury: 35% over 50

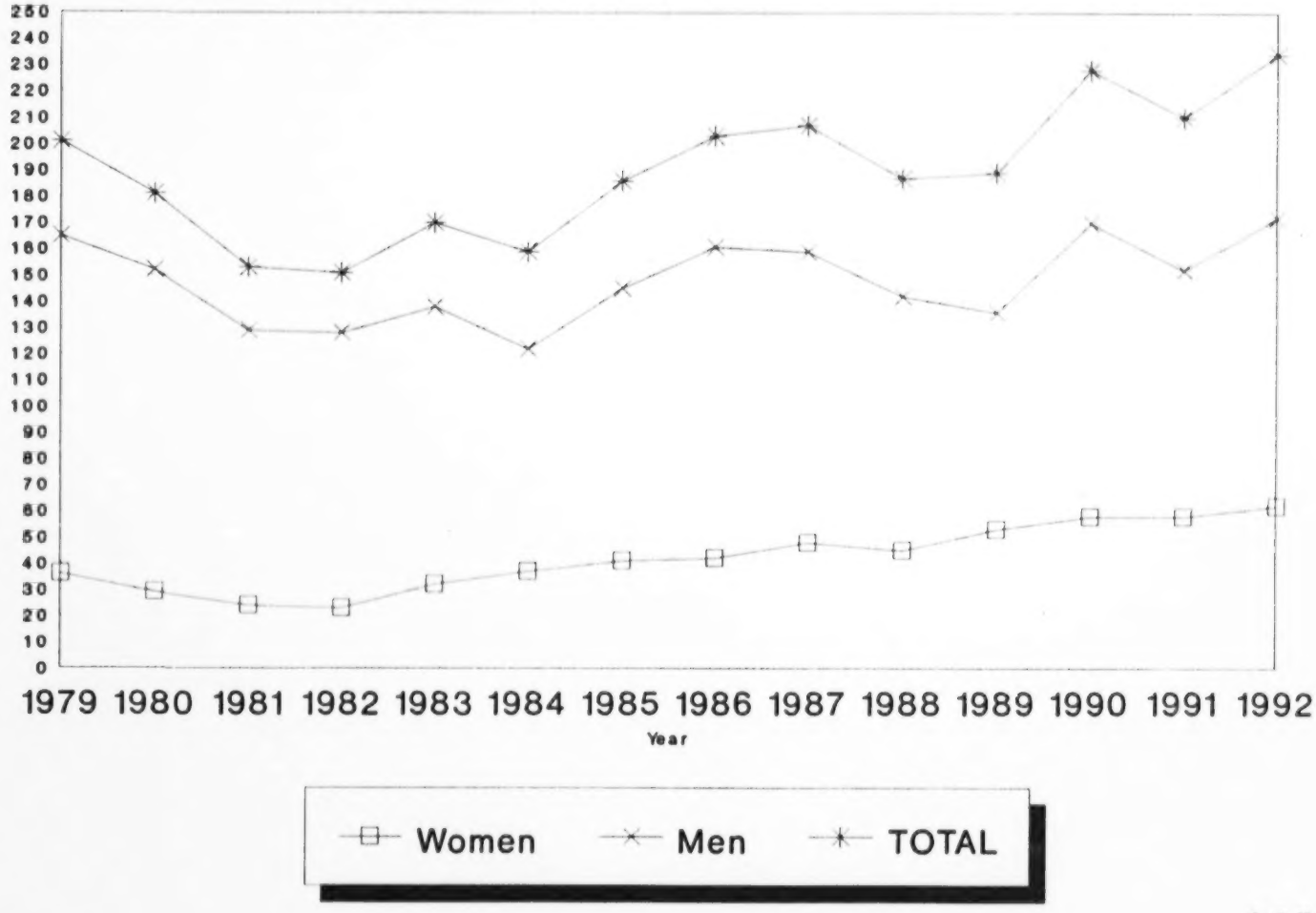
Staff Needs:

Australia:	**36,000 more staff between 1990 and 2001; i.e. between 2,900 and 3,600 per year!**
USA:	**By late 80s, part-time and temporary staff were more than half of the staff 3000 - 4000 needed annually**
Germany:	**26% part time in Universities 48% part time in Fachhochschulen**
UK:	**8,000 needed by 2010 to restore 1980 numbers!**

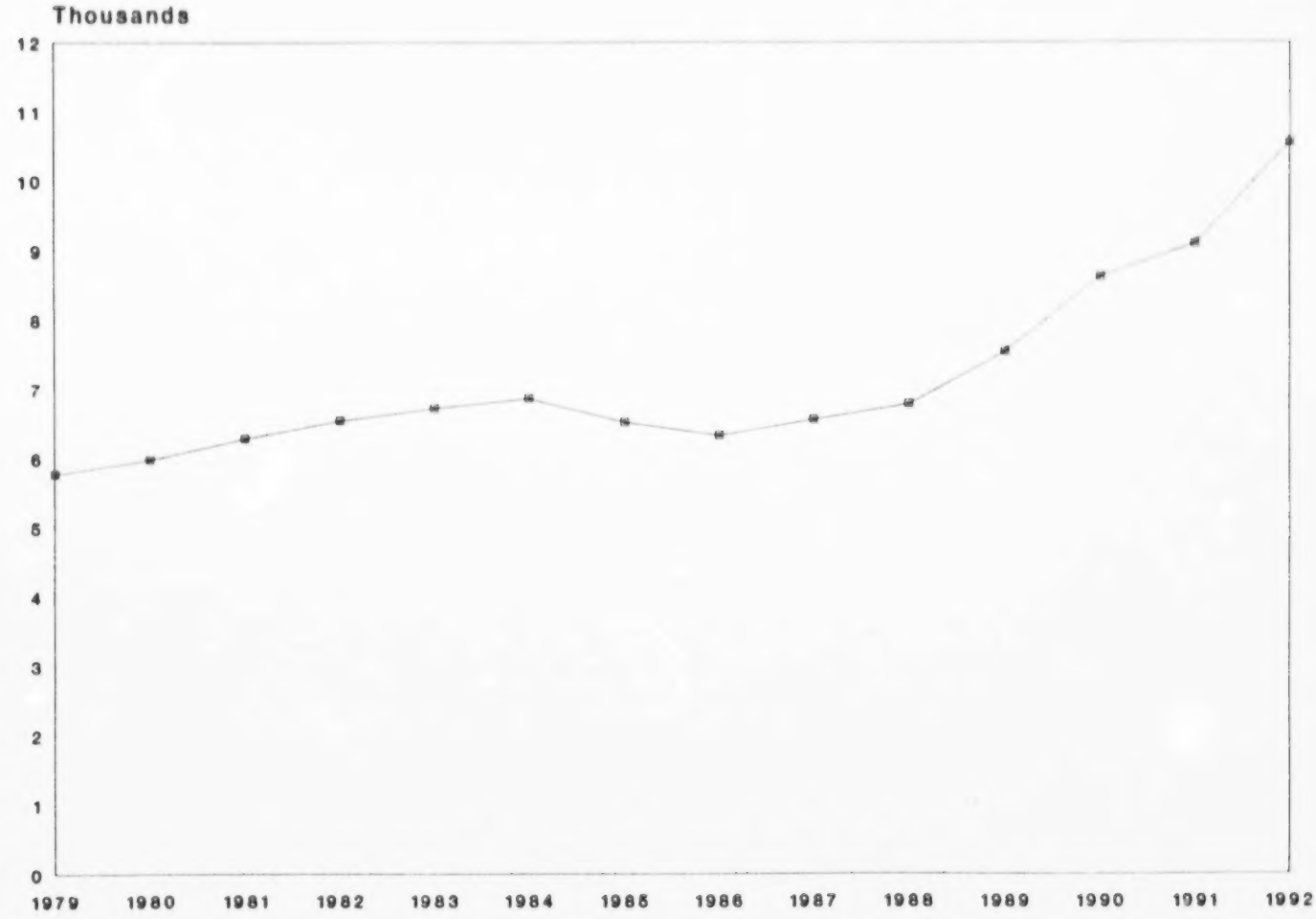
Projected Number of Academic Staff Retirements



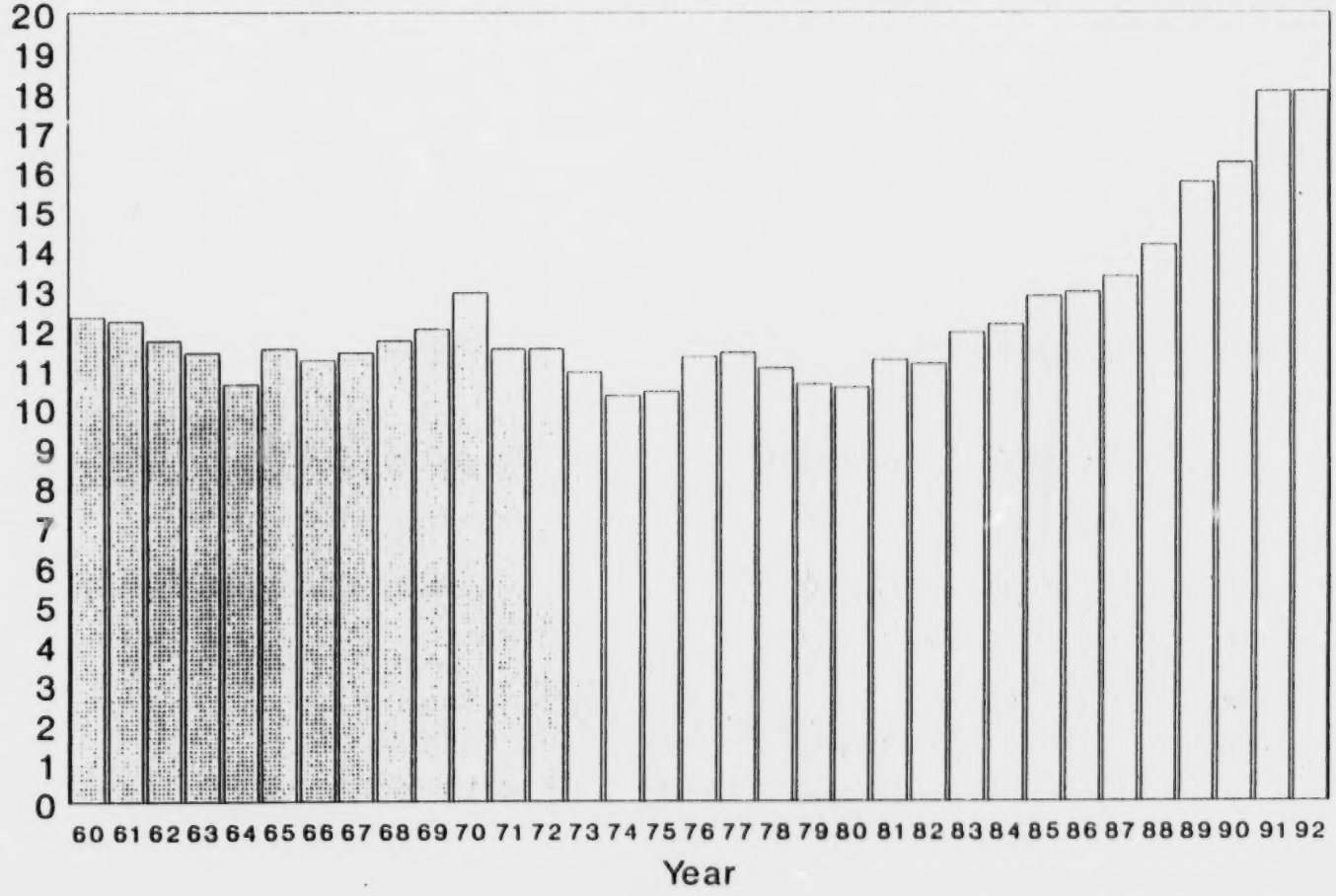
PHDs COMPLETED IN NEW ZEALAND



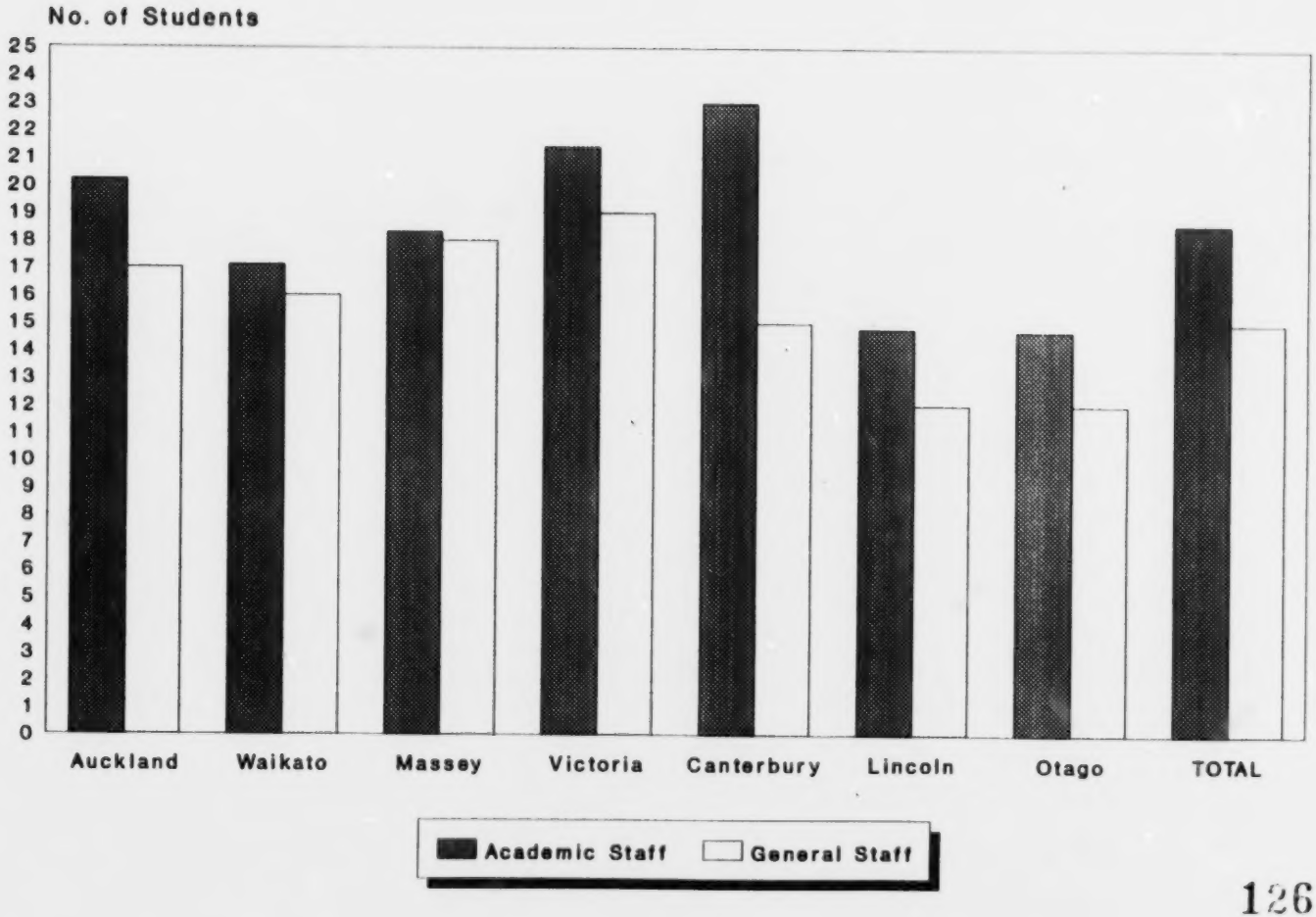
Bachelor Degrees in New Zealand



University Staff/Student Ratios
1960-1992



University Student:Staff Ratios
1993



Respondents: **Tim Blackmore, NZ Vice-Chancellors' Committee**
Ed Vos, Association of University Staff

Questions/Discussion

Key Issues

Staff data
It is almost impossible to complete an analysis of projected staffing requirements because of the lack of data available. Where data exists, it is often incompatible as institutions collect and code data differently.

Although it is recognised that standardised data is essential, institutions are reluctant to share information and are unwilling to co-operate in the establishment of a standardised database.

The Association of University Staff had offered to share the cost of establishing a standardised staff database with the Vice Chancellors' Committee but the offer was declined.

All tertiary institutions should be linked into one standardised database that collates information about staff, students and institutions.

NZQA will establish a record of learning database which may help with the problem of comparable data collection.

Currently, the Ministry of Education considers all staff data to be an internal matter for individual institutions. The Ministry does, however, publish staff gender breakdowns.

Age and gender data are essential for compiling staffing profiles.

Retirement
Lack of age data means that it is difficult to predict retirement rates and, therefore, to plan recruitment strategies.

Another significant issue related to retirement is that when senior staff retire they are often not replaced by another senior appointment. This allows institutions to save on the salary budget but at the expense of employing experienced staff.

Administrative workloads
The decentralisation of university administration has meant a significant increase in the workloads of academic staff who are required to take on administrative roles.

The dilemma facing academic staff is that to progress in their careers they must take on administrative roles. This impacts on the time they have for teaching and research and may affect the quality of education being offered to students.

Senior academic staff should spend the majority of their time in teaching and research not in administration.

In general, the workloads of university staff are becoming too great. Universities should employ more academic and general staff to ease the burden of existing staff.

Academic salaries

Academic staff do not receive adequate financial compensation for increased workloads. Academic staff have not had a pay increase since 1990 and academic salaries and superannuation now compare most unfavourably with those in countries such as Australia, Canada, Hong Kong, Singapore, United Kingdom and Unites States of America.

Enrolment projections

There was discussion about the divergent views of the keynote presenters and NZVCC. A graph showing "Forecast % University Enrolment Growth per annum vs Growth in Funded Places" was tabled by NZVCC.

NZCER AND AUSNZ

SEMINAR: THE LABOUR MARKET AND THE UNIVERSITIES

RESPONSE TO KEYNOTE PAPER: EDUCATING HIGHLY SKILLED LABOUR: DEMOGRAPHIC ASPECTS OF THE CONTRIBUTION OF THE UNIVERSITIES

MINISTRY OF EDUCATION

Introduction

The Ministry of Education is glad to see that Professor Pool and Ms Davies have relied almost entirely in the preparation of this paper on analysis which has been carried out by the Ministry. While there is general agreement about the power of the Cohort Component technique used, the analysis presented has failed to develop appropriate models for assessing the contribution of various factors which affect changes in participation. Consequently, the Ministry disagrees with the conclusions reached by Pool and Davies.

Methodological Issues

While demographic considerations are certainly a core component in projections of tertiary education enrolments there is no assessment in the information presented of the influence of changes in the economy, wage levels or labour market on changes in participation in tertiary education and training. Nor does the model attempt to assess the elasticity effects of changes in the price level of education to students on participation.

Although the methodology is not detailed in the paper no assessment of the relationship between the university sector and the other sectors who may potentially be catering for these same groups of students appears to have been made. The concentration on just the university sector overlooks a number of key issues in the provision of education and training in New Zealand. One such issue is that growth in participation in the post secondary education has not just been limited to the university sector and there has been considerable growth among other education and training providers.

Pool and Davies seem to be basing their model on previous trends in university enrolments and progression from the seventh form to university. An assessment of the likely drivers of future growth in tertiary participation would be far more useful from an analytical point of view than the rear view mirror extrapolation presented.

Retention and Progression to University

We do not concur with Pool and Davies with respect to their interpretation of the Ministry's analysis of retention and progression onto university. Clearly as form seven qualifications are a pre-requisite to entry into university education for those under 21, the increase in retention to form 7 has been a major driving force in university student growth. While the progression of Maori and total form seven cohorts onto university has remained relatively stable, as more students stay on at school until the seventh form a greater proportion of secondary school students move on to university study. There have been dramatic improvements in the proportion of school leavers progressing directly on to university, from about 11% at the beginning of the 1980s to around 21% at present.

Increasingly however, school leavers are also progressing into other forms of tertiary education. In 1980 only about 7% of school leavers progressed directly into a polytechnic programme, but this rate has increased to a level similar to that achieved for the university sector.

In responding to changes in retention, senior school programmes have become much more mixed in their orientation. We have witnessed the growth of multi-level study (with students studying across a range of form levels in any given year), the development of a range of employment oriented programmes for senior school students, and courses (such as LINK) supporting the transition of students between school and further education and training. There has also been a significant growth in the development of local or individual school based courses and subjects. Seventh form students now study a greater range of subjects - 45 subjects are listed in 'Education Statistics of New Zealand' for 1987, whereas the corresponding table for 1992 shows 77 subjects. This increase in the range of subjects available has not reduced the numbers studying core subjects, and there have been increases in the numbers studying all the core subjects listed by Pool and Davies except biology.

The range of subjects available at universities has also increased in recent years, and universities will need to offer an increasingly diverse range of programmes if they are to cater to the range of students now coming out of our secondary schools.

Trends in Participation

Pool and Davies state that increases in numbers of full-time students in recent years were 'probably due more to purely demographic changes ... than to real and sustainable growth'. Table 1 shows that although part-time participation rates for those aged 18 to 24 years have fluctuated over recent years, there has been a steady rise in the proportion of the population studying full-time at university. These data show that growth in numbers of this core age group enrolled at university has not been entirely due to increasing numbers of people of this age in the population.

Table 1: Full-time and Part-time University Participation Rates, 18 to 24 Year-olds, 1983 - 1993

	Part-time		Full-time		Total	
	No. Enrolled	Participation Rate (per 100)	No. Enrolled	Participation Rate (per 100)	No. Enrolled	Participation Rate (per 100)
1983	7370	1.8	28012	6.8	35382	8.6
1985	7626	1.9	29003	7.1	36628	8.9
1987	8065	2.1	31192	8.0	39166	10.1
1989	7569	1.9	38108	9.6	45677	11.5
1991	8012	2.0	44815	11.4	52827	13.4
1993	10973	2.7	48681	12.1	59654	14.9

In their discussion of participation Pool and Davies tend to over look or discount the rapid improvements which have occurred in university and tertiary participation in the past 3 to 5 years. In their 1987 work they argued that :

> "Failure to achieve a participation rate of at least 13 per cent by the year 2007 would impose serious handicaps on the economy and New Zealand society at large." (Watts 1987 pp.15).

Yet a level of 13% participation among the core tertiary ages was achieved by the university sector in 1991, with over 25% of 18-24 year olds in tertiary education (including polytechnics, and colleges of education). Since 1991 there has been continued growth in the university sector. In 1993 15% of the population in the core tertiary age group (18 to 24 years) was enrolled in a university.

Enrolment Projections

Projecting the number of enrolments in universities is an inexact science, because of the complex set of factors which must be taken into account, and the number of assumptions which need to be made. The table presented in the keynote paper shows precise numbers (for example, the projected number of enrolments in 1996 is shown as 70786), and it should be noted that forecasting is unlikely to be accurate at this level of precision.

Pool and Davies seem to have based their projections on university enrolment data for years up to 1991, and by doing this have under-estimated participation in universities.

The projections of the 18-24 cohort seem unnecessarily pessimistic. The figures given for 1996 would require a small drop in participation among this age group. Based on Department of Statistics medium population projections (1991 base), the 1996 figures given would equate to a participation rate for internal students of 12.7 per 100 population. A conservative estimate of the 1993 participation rate for internal students is 14%, so the 1996 figure would require a reduction of close to 2% in current participation levels at ages 18-24 years.

We can not concur in the medium to long term that participation at the core tertiary ages will decrease. This goes against all recent evidence in the New Zealand context and against the evidence available internationally.

The reduction in the size of cohorts in the core tertiary age group which will occur in the medium term is temporary, and may be off set by increases in the participation in the core age group. There may also be continuing improvements in the pool of older people returning to increase and upgrade their qualifications. The primary and secondary school sector have both experienced the impact of the progression of a smaller group of students through the school system. In the secondary sector until recently increases in retention offset any downward movement in population.

Universities and the Labour Force

The issue of population aging requires a re-appraisal of traditional concepts about education and training and the work force. As we increasingly need to rely on the population which has already passed through the core tertiary ages, education and training programmes which are orientated towards those currently in employment and on the job are as critical as the pre-employment type education and training programmes which have predominated in university programmes. In addition, New Zealand's labour force will increasingly need to respond to technological innovation, a range of unforseen economic shocks and the continued reorientation of our markets and products. In responding to these trends educational policy and programmes will need to support recurrent and work based training initiatives along side pre-employment education and training. It was therefore a shame to see that the paper excludes analysis of the universities extramural sector, along with the information on adult and community education.

THE NEW ZEALAND ACADEMY FOR THE HUMANITIES
TE WHĀINGA ARONUI

P O Box 10-693
Wellington

THE UNIVERSITIES AND THE LABOUR MARKET

Thursday 14 October 1993

What are the requirements for educating "highly skilled labour" in an information society/information economy?
What is the role of tertiary education institutions in shaping public understanding of the skills (the literacy) needed by the knowledge worker?

1. Tertiary Education in a Technological Culture.

The fact is that in almost every field of endeavour we have been licensing people, with undergraduate and graduate degrees, to meddle with both our present and our future who are notoriously ill-equipped to do so. The devastating consequences of the division and specialisation of intellectual labour and of the atomistic, reductionist and mechanistic assumptions upon which so much of our educational practice and credentialisation have rested, are now undeniable.[1]

2. Training and Education.

The balance between the needs of the employer for job specific training and the needs of individuals and society for more general, transferable skills is critical. We favour an emphasis on general, transferable skills, because they enable people to cope more readily with technological and structural change. They also provide a base for long term personal development, and enhance job mobility and access to further training and credentials.[2]

3. Humanities and Social Sciences as critical, not marginal knowledge.

At university level, the pressure in vocational education to maximise the substantive knowledge in courses, at the expense of 'inquisitive learning' and contextual understanding, has long-term adverse implications for the effectiveness of that education. It is important that adverse effects can be avoided by teaching students in ways which integrate and synthesize knowledge from various disciplines.

The humanities and social sciences have a powerful influence in shaping the way we see our society and evaluate changes and developments in it. By permeating our understanding of issues, and shaping them through use of language and critical analysis, the humanities and social sciences achieve broad changes to people's views of the world. They have a strong ethical component which, when fused with analytical techniques, gives them great strength in tackling complex problems.

The fact that the 'human sciences' typically deal with open-ended phenomena is believed to develop the capacity to handle ambiguity and uncertainty, to think and act in complex 'messy' situations, and hence to provide a training in interpretive and evaluative modes of thought. [3]

To understand the nature and direction of contemporary change is a fundamental agenda. 'Our ability to locate ourselves in a past-present-future continuum is not a sterile exercise

PTO

in contemporary periodisation: it affects how we plan for the future.' In planning for that future, an understanding of information, information technology and the information economy will prove crucial.[4]

4. The Information Economy.
The development of the information economy is likely to see transformations of all sorts of information and intelligence functions in firms and public agencies, and the emergence of new initiatives and actors.[5]

Are the requirements for educating "highly skilled labour" in this context encapsulated in the notion of Key Competencies, defined as
Collecting, analysing and organising information; communicating ideas and information; planning and organising activities; working with others in teams; using mathematical ideas and techniques; solving problems; and using technology.[6]

What educational strategies, curriculum designs and approaches to learning do we need to foster these qualities? What kind of cognitive institutions do we need to develop these approaches?[7]

5. The Labour Market.
Does this concept, while appearing to include the whole economy, in fact privilege certain sectors over others? In Canada the "cultural sector" covers occupations which represent 25% of the country's economy. In Australia health, education and public administration . . . account for 25% of production. The "cultural industry " was estimated in 1988 as having a turnover of $14billion and employing 200,000 people. Does the concept "highly skilled labour" include these areas of employment?

In recent years, efforts to harness Australia's knowledge base to economic development have concentrated on science and technology. In ASTEC's view, more effective use could be made of the investment in these areas if the human, social and economic factors were better understood and this understanding integrated with scientific and technological advances.[8]

Dr Brian Opie
President

---

[1]D.Kenny, "The Liberal Arts and the Human Future", in *Research and Development in Higher Education*, Vol 12 (1990), 212.

[2]*Report of the Committee of Enquiry into Labour Market Programs* (The Kirby Report, 1985) quoted in *Windows onto Worlds. Studying Australia at Tertiary Level* (Commonwealth of Australia, 1987), p.133.

[3]Australian Science and Technology Council (ASTEC), *Bridging the Gap. The Social Sciences and Humanities in Australia* (1993), pp. 33-34, 2, 14.

[4]*Understanding Information. Business, Technology, and Geography* ed Kevin Robins (London and New York: Bellhaven Press), 1992, p.16.

[5]Ibid., p.96.

[6]ASTEC, *Bridging the Gap*, p.32.

[7]Kenny, p.211.

[8]ASTEC, *Bridging the Gap*, pp. 11, 2.

AUS/NZCER Seminar
THE LABOUR MARKET AND THE UNIVERSITIES

A Note on Occupational Projections in the United States of America

Introduction

In assessing likely future trends in occupational and industrial demand for skills, New Zealand students, as well as the secondary and tertiary institutions which they attend, are handicapped by the absence of any New Zealand system of occupational forecasting. The absence of such forecasts also handicaps discussions such as those at today's seminar.

The Position in the United States

The New Zealand situation contrasts sharply with that in the United States where the Bureau of Labor Statistics in the US Department of Labor develops alternative projections of the labor force, economic growth, industry output and employment and occupational employment every other year. The most current projections, covering 1990-2005, were published in the November 1991 issue of the Monthly Labor Review.

The Bureau uses input-output tables, tracing transactions between all industries in the economy, as the basis for its projections. Input output tables for the base year of the projections are projected to the target year, currently 2005, with allowance being made for technological changes and other factors that are likely to alter inputs over time. The basic industry data generated in this way is then combined with data on likely changes in occupational staffing patterns of industries which takes account of technological change, changes in business practices, and changes in goods and services produced.

The attached tables illustrate the range of data published by the US Department of Labor. The first page is reproduced from the Annual Statistical Abstract of the United States, whilst tables 2 and 3 are drawn from downstream article which reported more detailed analyses of likely trends in scientific and technical employment.

The Department of Labor's forecasts are widely used and feed into a large number of downstream publications in which various authors develop their own view on likely overall employment trends. In 1989, Carl McDaniels in introducing his "Career Counselling Strategies for the 1990s and Beyond", "written specifically for the more than 150,000 counsellors who help people with career development" noted "there are scores of official government publications on the jobs and workers of the future. There exists an equal number of unofficial monographs, reports, and books on the same topic."

The New Zealand Position

New Zealand policy-makers have shown little interest in occupational forecasting. The basic input-output modelling and forecasting systems needed to underpin comprehensive occupational forecasting have been developed over the past 20 years at the Victoria University Research Project on Economic Planning and at the NZ Planning Council. Parallel systems exist at Business and Economic Research Limited and are currently being used, with assistance from FoRST's public good science fund to develop economic projections by industry. To date, attempts to secure funding sufficient to add an occupational dimension to these forecasts have been unsuccessful.

Dennis Rose
Business and Economic Research Ltd.
14 October 1993.

No. 630. Civilian Employment in Occupations with the Largest Job Growth and in the Fastest Growing and Fastest Declining Occupations: 1990 and 2005

[In thousands, except percent. For occupations employing 100,000 or more in 1990. Includes wage and salary jobs, self-employed and unpaid family members. Estimates based on the Current Employment Statistics estimates and the Occupational Employment Statistics estimates. See source for methodological assumptions. Minus sign (-) indicates decrease]

OCCUPATION	EMPLOYMENT				PERCENT CHANGE 1990-2005		
	1990	2005 [1]					
		Low	Moderate	High	Low	Moderate	High
Total [2]	122,573	136,806	147,191	154,543	12	20	26
LARGEST JOB GROWTH [3]							
Salespersons, retail	3,619	4,180	4,506	4,728	15	24	31
Registered nurses	1,727	2,318	2,494	2,648	34	44	53
Cashiers	2,633	3,094	3,318	3,474	18	26	32
General office clerks	2,737	3,149	3,407	3,597	15	24	31
Truck drivers light and heavy	2,362	2,767	2,979	3,125	17	26	32
General managers and top executives	3,086	3,409	3,684	3,871	10	19	25
Janitors and cleaners [4]	3,007	3,332	3,562	3,729	11	18	24
Nursing aides, orderlies, and attendants	1,274	1,700	1,825	1,934	33	43	52
Food counter, fountain, and related workers	1,607	2,067	2,158	2,229	29	34	39
Waiters and waitresses	1,747	2,110	2,196	2,262	21	26	29
Teachers, secondary school	1,280	1,575	1,717	1,849	23	34	45
Receptionists and information clerks	900	1,228	1,322	1,394	36	47	55
Systems analysts and computer scientists	463	769	829	864	66	79	87
Food preparation workers	1,156	1,442	1,521	1,585	25	32	37
Child care workers	725	1,027	1,078	1,123	42	49	55
Gardeners and groundskeepers, except farm	874	1,158	1,222	1,275	33	40	46
Accountants and auditors	985	1,235	1,325	1,385	25	34	41
Computer programmers	565	811	882	923	44	56	63
Teachers, elementary	1,362	1,538	1,675	1,803	13	23	32
Guards	883	1,094	1,181	1,238	24	34	40
Teacher aides and educational assistants	808	999	1,086	1,165	24	34	44
Licensed practical nurses	644	849	913	968	32	42	50
Clerical supervisors and managers	1,218	1,373	1,481	1,559	13	22	28
Home health aides	287	512	550	582	78	92	103
Cooks, restaurant	615	840	872	898	37	42	46
Maintenance repairers, general utility	1,128	1,283	1,379	1,447	14	22	28
Secretaries, except legal and medical	3,064	3,065	3,312	3,488	-	8	14
Cooks, short order and fast food	743	953	989	1,018	28	33	37
Stock clerks, sales floor	1,242	1,343	1,451	1,524	8	17	23
Lawyers	587	745	793	830	27	35	42
Marketing, advertising, and public relations managers	427	582	630	659	36	47	54
Food service and lodging managers	595	762	793	819	28	33	38
Physicians	580	730	776	818	26	34	41
Financial managers	701	828	894	939	18	28	34
Teachers, preschool and kindergarten	425	555	598	636	31	41	50
Automotive mechanics	757	861	923	969	14	22	28
Medical secretaries	232	363	390	415	57	68	79
Dining room and cafeteria attendants and bar helpers	461	592	619	641	28	34	39
Electricians	548	652	706	748	19	29	36
Carpenters	1,057	1,134	1,209	1,274	7	14	20
FASTEST GROWING							
Home health aides	287	512	550	582	78	92	103
Systems analysts and computer scientists	463	769	829	864	66	79	87
Personal and home care aides	103	170	183	194	64	77	87
Medical assistants	165	268	287	306	62	74	85
Human services workers	145	231	249	264	59	71	82
Radiologic technologists and technicians	149	234	252	268	58	70	80
Medical secretaries	232	363	390	415	57	68	79
Psychologists	125	193	204	214	55	64	72
Travel agents	132	199	214	224	51	62	70
Correction officers	230	342	372	400	49	61	74
Flight attendants	101	146	159	168	45	59	67
Computer programmers	565	811	882	923	44	56	63
Management analysts	151	218	230	240	44	52	58
Child care workers	725	1,027	1,078	1,123	42	49	55
FASTEST DECLINING							
Electrical and electronic equipment assemblers, precision	171	78	90	92	-55	-48	-46
Electrical and electronic assemblers	232	112	128	131	-52	-45	-44
Child care workers, private household	314	176	190	200	-44	-40	-36
Textile draw-out and winding machine operators [5]	199	116	138	142	-41	-31	-29
Telephone and cable TV line installers and repairers	133	85	92	98	-36	-30	-26
Machine tool cutting operators and tenders [6]	145	93	104	107	-35	-29	-26
Cleaners and servants, private household	411	287	310	326	-30	-25	-21
Machine forming operators and tenders [6]	174	119	131	137	-32	-25	-21
Switchboard operators	246	175	189	198	-29	-23	-19
Farmers	1,074	822	850	876	-23	-21	-18
Sewing machine operators, garment	585	368	469	478	-37	-20	-18
Farm workers	837	720	745	766	-14	-11	-8
Typists and word processors	972	805	869	916	-17	-11	-6

- Represents or rounds to zero. [1] Based on low, moderate, or high trend assumptions. [2] Includes other occupations, not shown separately. [3] In descending order, based on absolute employment change 1990 to 2005 (moderate growth). [4] Includes maids and housekeepers. [5] Includes tenders. [6] Metal and plastic.

Source: U.S. Bureau of Labor Statistics, *Monthly Labor Review*, November 1991.

Table 2. **Employment in industries with a high concentration of scientists, engineers, and technicians, 1990 and projected to 2005, low, moderate, and high alternatives**

(Numbers in thousands)

Industry	Total employment				Percent change				
	1990	2005			1990–2005			From moderate projection	
		Low	Moderate	High	Low	Moderate	High	Low	High
Total, all industries	112,053	125,223	135,280	142,696	11.8	20.7	27.3	-7.4	5.5
Total, all special industries	28,718	29,701	33,027	35,783	3.4	15.0	24.6	-10.1	8.3
Manufacturing	8,067	6,465	7,672	8,478	-19.9	-4.9	5.1	-15.7	10.5
Ordnance and accessories, n.e.c.[1]	75	40	46	50	-46.5	-38.6	-33.2	-13.0	8.7
Engines and turbines	89	59	72	81	-33.1	-19.2	-8.5	-17.2	13.2
Farm and garden machinery	106	99	113	120	-7.1	6.4	12.9	-12.7	6.1
Construction and related machinery	228	183	212	230	-19.6	-7.2	.8	-13.3	8.6
Metalworking machinery	330	268	316	346	-18.9	-4.4	4.6	-15.2	9.4
Special industry machinery	159	122	145	156	-23.3	-9.0	-2.0	-15.7	7.7
General industrial machinery	248	173	212	230	-30.4	-14.7	-7.4	-19.4	8.6
Computer and office equipment	439	304	377	421	-30.9	-14.2	-4.2	-19.4	11.6
Refrigeration and service machinery	177	177	200	217	.1	13.0	22.8	-11.5	8.7
Industrial machinery, n.e.c.[1]	317	271	295	312	-14.6	-7.0	-1.8	-8.2	5.5
Electric distributing equipment	97	72	84	93	-26.2	-13.8	-4.0	-14.3	11.4
Electrical industrial apparatus	169	114	141	159	-32.3	-16.5	-5.5	-18.9	13.2
Household appliances	125	89	93	95	-29.0	-25.3	-24.5	-4.9	1.1
Electric lighting and wiring equipment	189	165	191	211	-13.0	1.0	11.6	-13.8	10.6
Household audio and video equipment	83	32	74	90	-61.6	-10.9	8.8	-56.9	22.1
Communications equipment	263	187	226	245	-29.0	-14.3	-6.9	-17.1	8.6
Electronic components and accessories	581	428	599	712	-26.2	3.1	22.6	-28.4	19.0
Miscellaneous electrical equipment and supplies	166	139	160	178	-16.7	-3.5	7.0	-13.7	10.8
Motor vehicles and equipment	809	664	744	796	-18.0	-8.1	-1.6	-10.8	7.0
Aircraft and parts	706	609	715	789	-13.7	1.2	11.8	-14.8	10.4
Ship and boat building and repairing	187	161	180	195	-14.1	-3.7	4.4	-10.8	8.4
Railroad equipment	33	30	34	35	-9.3	.9	6.3	-10.1	5.4
Guided missiles and space vehicles	186	140	164	181	-24.7	-11.7	-2.5	-14.8	10.4
Miscellaneous transportation equipment	58	51	52	54	-12.4	-9.8	-7.1	-2.9	3.1
Search and navigation equipment	284	252	295	321	-11.2	4.1	13.1	-14.7	8.7
Measuring and controlling devices	324	220	261	284	-31.9	-19.4	-12.4	-15.5	8.8
Medical instruments and supplies	244	300	331	356	22.8	35.5	46.0	-9.4	7.8
Ophthalmic goods	42	35	45	51	-16.4	7.6	21.9	-22.3	13.2
Photographic equipment and supplies	100	64	76	84	-35.9	-24.1	-16.2	-15.6	10.4
Industrial inorganic chemicals	142	86	110	131	-39.8	-22.5	-7.5	-22.3	19.4
Plastics materials and synthetics	181	142	175	200	-21.5	-3.2	10.8	-18.9	14.4
Drugs	238	250	293	327	4.9	23.3	37.5	-14.9	11.5
Soap, cleaners, and toilet goods	160	155	179	202	-3.0	12.0	26.0	-13.4	12.5
Paints and allied products	62	47	56	65	-24.3	-9.2	4.5	-16.6	15.2
Industrial organic chemicals	154	106	136	162	-31.6	-12.0	5.1	-22.3	19.4
Agricultural chemicals	56	33	38	43	-40.4	-31.4	-23.8	-13.0	11.2
Miscellaneous chemical products	100	90	109	126	-10.1	9.4	25.6	-17.8	14.8
Petroleum refining	118	75	85	90	-36.4	-28.1	-23.6	-11.6	6.3
Miscellaneous petroleum and coal products	40	34	37	39	-13.9	-5.8	-.8	-8.6	5.3
Nonmanufacturing	20,651	23,236	25,355	27,305	12.5	22.8	32.2	-8.4	7.7
Forestry	25	30	32	34	18.8	28.0	34.8	-7.2	5.3
Crude petroleum, natural gas, and gas liquids	196	136	172	188	-30.5	-12.0	-4.0	-21.0	9.2
Highway and street construction	241	289	315	337	20.1	30.9	40.3	-8.3	7.1
Heavy construction, except highway and street	522	591	644	690	13.1	23.3	32.1	-8.3	7.1
Pipelines, except natural gas	18	17	19	20	-9.7	1.1	7.6	-10.7	6.4
Computer and data-processing services	784	1,257	1,494	1,690	60.3	90.6	115.5	-15.9	13.1
Education, public and private	9,440	10,846	11,756	12,604	14.9	24.5	33.5	-7.7	7.2
Engineering and architectural services	793	853	1,083	1,310	7.6	36.6	65.3	-21.3	21.0
Federal government	2,266	2,223	2,236	2,246	-1.9	-1.4	-.9	-.6	.5
State government	2,148	2,318	2,520	2,713	7.9	17.3	26.3	-8.0	7.7
Local government	4,217	4,677	5,084	5,473	10.9	20.5	29.8	-8.0	7.7
Total, all other industries	83,336	95,522	102,253	106,912	14.6	22.7	28.3	-6.6	4.6

[1] n.e.c. = not elsewhere classified.

Table 3. **Employment[1] of scientists, engineers, and technicians, 1980 and projected to 2005, low, moderate, and high alternatives**

(Numbers in thousands)

Occupation	Total employment				Percent change				
	1990	2005			1990–2005			From moderate projection	
		Low	Moderate	High	Low	Moderate	High	Low	High
Total	5,650	6,177	7,606	8,964	9.3	34.6	58.7	-18.8	17.8
Engineering, mathematical, and natural science managers	315	337	423	505	6.8	34.2	60.0	-20.4	19.2
Engineers	1,519	1,489	1,919	2,332	-2.0	26.3	53.5	-22.4	21.5
Aeronautical and astronautical engineers	73	64	88	112	-12.2	20.5	53.3	-27.1	27.2
Chemical engineers	48	41	54	67	-15.9	11.6	38.8	-24.6	24.3
Civil engineers, including traffic engineers	198	214	257	302	7.9	30.0	52.7	-17.0	17.4
Electrical and electronics engineers	426	425	571	715	-.3	34.1	67.8	-25.7	25.1
Industrial engineers, except safety engineers	135	131	160	185	-2.6	18.9	36.8	-18.1	15.1
Mechanical engineers	233	219	289	358	-6.3	23.9	53.6	-24.4	24.0
Metallurgists and metallurgical, ceramic, and materials engineers	18	17	22	27	-7.5	21.3	48.8	-23.7	22.3
Mining engineers, including mine safety engineers	4	4	4	5	-11.4	4.2	19.0	-15.0	14.2
Nuclear engineers	18	15	18	21	-16.3	-.3	15.0	-16.1	15.3
Petroleum engineers	17	14	18	20	-20.1	1.2	13.8	-21.1	12.4
All other engineers	347	346	436	519	-.3	25.8	49.7	-20.7	19.0
Life scientists	174	194	230	264	12.0	32.3	52.4	-15.3	15.2
Agricultural and food scientists	25	28	32	35	11.2	26.6	41.0	-12.1	11.4
Biological scientists	62	71	83	95	13.9	33.9	52.8	-14.9	14.2
Foresters and conservation scientists	29	31	32	33	8.4	12.5	15.9	-3.6	3.0
Medical scientists	19	26	31	37	36.9	66.0	94.1	-17.5	17.0
All other life scientists	39	39	51	64	.2	31.8	65.6	-24.0	25.7
Computer, mathematical, and operations research analysts	571	835	987	1,127	46.2	72.8	97.3	-15.4	14.1
Actuaries	13	17	18	18	25.9	33.6	38.2	-5.8	3.4
Systems analysts and computer scientists	463	694	829	954	49.9	78.9	105.9	-16.2	15.0
Statisticians	16	15	18	20	-1.9	11.7	23.8	-12.2	10.8
Mathematicians and all other mathematical scientists	22	19	24	28	-10.7	9.5	29.0	-18.4	17.8
Operations research analysts	57	89	100	108	55.1	73.2	87.4	-10.5	8.2
Physical scientists	200	187	241	294	-6.4	20.5	47.6	-22.3	22.4
Chemists	83	72	96	120	-12.8	15.6	44.5	-24.6	25.1
Geologists, geophysicists, and oceanographers	48	47	58	68	-.8	22.3	42.7	-18.9	16.6
Meteorologists	5	6	7	8	7.1	29.5	51.2	-17.3	16.7
Physicists and astronomers	20	16	21	26	-20.2	5.1	30.6	-24.1	24.2
All other physical scientists	44	46	59	73	4.5	33.9	65.9	-21.9	23.9
Social scientists	224	296	320	342	32.3	42.8	52.6	-7.4	6.8
Economists	37	41	45	49	9.7	21.4	31.9	-9.6	8.6
Psychologists	125	191	204	216	53.1	63.6	73.3	-6.4	5.9
Urban and regional planners	23	26	28	30	9.7	18.8	27.4	-7.7	7.2
All other social scientists	38	39	43	46	.2	10.8	20.6	-9.6	8.9
Technicians, engineering and science, and computer programmers	2,647	2,839	3,486	4,099	7.2	31.7	54.9	-18.6	17.6
Engineering technicians	755	762	965	1,161	.9	27.8	53.8	-21.0	20.3
Electrical and electronics technicians/ technologists	363	378	488	594	4.2	34.4	63.6	-22.5	21.7
All other engineering technicians and technologists	392	384	477	568	-2.1	21.7	44.9	-19.6	19.0
Drafters	326	299	370	439	-8.2	13.4	34.6	-19.1	18.7
Science and mathematics technicians	246	243	305	366	-1.5	23.8	48.5	-20.4	20.1
Computer programmers	565	773	882	972	36.9	56.1	72.1	-12.3	10.2

[1] Includes wage and salary and self-employed workers.

COMMENTARY ON THE DAY'S PROCEEDINGS

Introduction

The underlying question which links the papers presented at the seminar is "what drives demand for university output?" Four main areas were identified and developed to greater or lesser extent in discussion:

- the influence of demographic trends;
- the causes of changes in university participation rates;
- what determines the range of courses on offer within the universities; and
- how do the universities go about ensuring an appropriate product mix.

Demographic trends

To an outsider, the most striking thing about the discussion on demographics is the apparent absence of an agreed reference set of forecasts of university student numbers. The very different forecasts prepared by Pool/Davies and Blackmore are suggestive of a system which does not have a very good idea of where it might be going nor, indeed, really sees the need for continuing analysis and forecasting in the area of university participation and enrolments.

The underlying driver of university participation is, of course, the population age structure. Numbers within any particular age group can be predicted with reasonable accuracy over a five to ten year span given our knowledge of the population age structure. Fluctuations in migration add a degree of variability but not sufficient to prevent useful forecasting.

The scale of the underlying demographic influences is summarised in the following projections by Statistics New Zealand.

Projected population ages 15-19 and 20-24 (thousands)

	Age Group 15-19	20-24
1991	290	289
1992 zero migration	253	276
5000 net migration gain	255	282
2001 zero migration	252	239
5000 net migration gain	255	246

Source: Population, Labour Force and Household Projections 1991-2031, Department of Statistics, Tables 2.24 and 2.25.

Clearly, there is going to be a significant fall in numbers in the population age groups from which the universities and other tertiary institutions draw their core student population.

Participation rates

More difficult issues arise around trends in age-specific participation rates. As Pool/Davies and Blackmore record, these have changed markedly in recent years, particularly for the core population age groups. The differences between the two papers arise around different assessments of likely future trends in age-specific participation rates. What is clear from a comparison of the two papers is that these differences matter a lot in terms of future university numbers.

Several factors need to be taken into account:

- the extend to which recent rises in core student participation were a short-term reaction to adverse labour market conditions and the extent to which they reflect a developing commitment to increased educational attainment;
- the influence of changes in student support;
- the influence of competitive pressures from other educational institutions including, particularly, the polytechnics; and
- changes in participation by mature students.

Recent changes in secondary school participation have been dramatic, as is illustrated in the Pool/Davies paper. Clearly a lot depends on whether senior level participation rates have now reached a new plateau and, if not, whether they are set to rise or fall in the event of economic recovery. The fact that it is not possible to make a judgement on this, on the basis of material presented to the seminar, suggests a need for research and analysis.

I found myself tripping up over the use of the term "progression rates" in the Pool/Davies paper (see for example the paragraph on page X opening "It can be concluded..."). The rate is calculated with reference to the seventh form population and the data shows that seventh formers in the Waikato University District were less likely to progress to university in 1992 than in 1997. That does not imply that secondary school entrants were less likely to progress to university, because that rate depends on the rate of retention to the seventh form (which has increased dramatically) as well as the rate of progression from the seventh form.

On the question of mature students, the point made by Blackmore that small changes in participation rates can, given the size of the underlying population, make large differences in student numbers is certainly correct. The implicit question, of course, is how large are such changes likely to be? Meade's comments on the determinants of women's participation are relevant here, as are those on the possible impact of science reforms and study right policies on students seeking higher degrees.

It is possible that some will dismiss discussion on likely future changes in participation rates as academic because of the difficulty of precise quantification. Such a conclusion would miss the point. Because the production cycles of universities stretch over several years, administrators inevitably work with some implicit view of likely future trends. Decision-makers at many points in the system would be assisted by better information on emergent trends, however qualified.

The range of courses on offer

One of the central concerns of Upton's paper is with what determines the subject range on offer within the university.

Both historically and at present, it is clear that demand for courses is largely student driven. So, what determines the subject choice of students? The answer is that we don't have a very clear idea. There are references to peer pressures; to varying degrees of awareness of earnings prospects in various professions; to the fact that in many ways the subject content of a student's career is, from the point of view of potential employers, of secondary importance to skills in argument,

research and analysis. Finally there is the obvious fact that choices of subject area at the university are considerably conditioned by areas of specialisation developed during secondary schooling.

Other considerations enter into the matter.

Student choice must be presumed, as Upton notes, to be influenced by the price signals facing students. We would expect the pattern of choice to be different under a programme of full-cost charging for subject courses than under a regime of free provision.

These issues also relate to equity in access. A nation, which ensures that all groups within society have an equal chance of participating in university education, is likely to find a rather different structure of courses than that which would prevail if entry were biased towards an economic or social elite.

Upton suggests that we could do a lot to improve the information available to students by addressing those areas where information is weakest. He notes that the "quality of labour market information readily available to tertiary students, who may well wish to change their minds about careers and course choices, not high." My note on occupational forecasting in the United States is relevant in this context. In discussion recently with a visiting American academic, I commented on the irony of the fact that the world's leading market economy has one of the strongest occupational forecasting programmes. His response was "but a market economy depends on information". Occupational forecasts will always be approximate but we are dealing with a field which is by its nature uncertain. Ongoing analysis and forecasting has the effect of reducing uncertainty and therefore can be expected to contribute to decision-making by both individual and institutional players within the secondary and tertiary systems.

Finally, in the area of demand for university output, it is important to acknowledge the frequently made point that important though the labour market functions of the university are, those functions alone do not determine the proper role for the universities. Their general contribution to the development and transmission of knowledge is fundamental.

The product mix of universities

A number of contributions touched on aspects of the capacity of the university to respond to the emerging pattern of demand for its services.

Probably the first point to note is that the universities are individually and collectively exposed to increasing competition. To an increasing extent, the grants particular institution are conditioned by the growth and subject distribution of students within that institution.

Important questions were raised in relation to the degree of responsiveness within institutions to changing patterns of subject demand. This is clearly related to issues of staffing and staff age structures raised by the Association of University Staff and discussed in an international context by Kogan in a paper circulated at the seminar.

The discussion on these issues was very limited and certainly not sufficient to allow an outsider to the university system to form a judgement as to their weight. It did however seem to me that the implications of the changes occurring in the systems of governance and funding are more far-reaching and profound than appreciated by some. I am in no position to assess the quality of university administration, but some of the references to increases in the administrative rather than teaching staff seemed to reflect a lack of appreciation of the extent of the transfer of responsibility from central government to the institutions themselves and the associated increases in requirements for staffing, planning, strategic analysis and decision making.

Dennis Rose
Business and Economic Research Ltd.